United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with the
Illinois Agricultural
Experiment Station

Soil Survey of Marshall County, Illinois

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How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

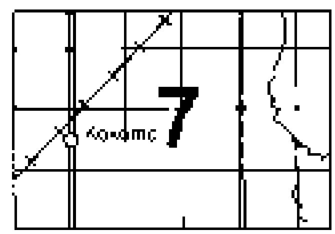
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

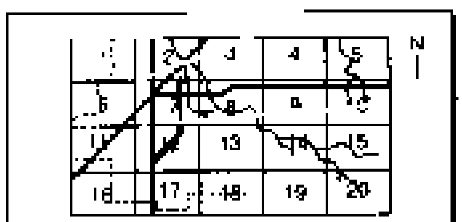
To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



MAP SHEET



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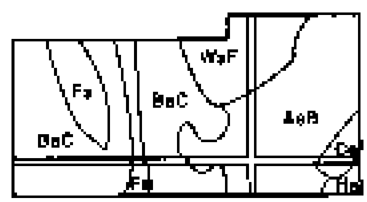
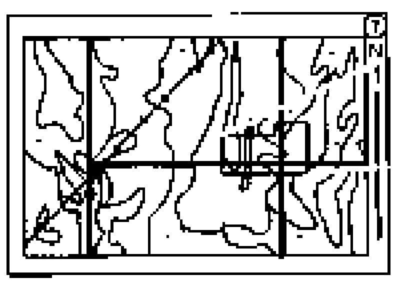


AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.



MAP SHEET

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1995. Soil names and descriptions were approved in 1997. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1997. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Marshall-Putnam County Soil and Water Conservation District. The Marshall County Board and the Illinois Department of Agriculture contributed financially to the survey.

Cover: An area of Radford silt loam, 0 to 2 percent slopes, occasionally flooded, on the nearly level flood plain in Marshall County. Hennepin loam, 35 to 60 percent slopes, is on the steep bluffs.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web. The address is http://www.nrcs.usda.gov.

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Issued 2001

Foreword

This soil survey contains information that can be used in land-planning programs in Marshall County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

William J. Gradle
State Conservationist
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Soil Survey of Marshall County, Illinois

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Soils surveyed by K.D. Hanson, S.K. Higgins, W.M. Teater, M.B. Walker, and S.E. Zwicker, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Illinois Agricultural Experiment Station

MARSHALL COUNTY is in north-central Illinois (fig. 1). It has an area of 254,880 acres, or about 398 square miles. It is bordered on the north by Bureau and Putnam Counties, on the east by La Salle County, on the south by Peoria and Woodford Counties, and on the west by Stark County. In 1990, the population of Marshall County was 12,846 and that of Lacon, the county seat, was 1,986.

This soil survey updates the survey of Marshall County published in 1937 (Winters and others, 1937). It provides more information and has larger maps, which show the soils in greater detail.

General Nature of the County

Marshall County is made up of glacial till plains and moraines covered by loess ranging up to 8 feet in thickness, except in the areas near the Illinois River. The Illinois River bisects the county through the middle. Along the Illinois River are the associated flood plains, terraces, and backwater lakes. Soils on the bluffs along the Illinois River and its associated creeks are steeply sloping. Soils in the areas away from the bluffs are mostly level to gently sloping. The texture of the glacial till varies, grading from loam in the western part of the county to silty clay in the eastern part.

The dominant industry in the county is agriculture. The major crops are corn and soybeans, and the major livestock enterprises produce pork and beef. Other parts of the agriculture industry include seed production and grain shipping ports along the Illinois River, which provide access to barge traffic.

History of Modern Settlement and Development

Marshall County was established on January 19, 1839. It was named after Supreme Court Chief Justice John Marshall (Marshall County Historical Society, 1983). The first permanent European settlers in the area were Colonel John Strawn and his family, who arrived in 1829. The early settlers found many areas of nearly level and gently sloping prairie with tall summer grasses and numerous species of wildflowers. In the middle of the county, nearly level to very steep areas of hardwood forests covered the flood plain and bluffs along the Illinois River and its adjoining creeks. Good soil and abundant timber made this region popular to the early settlers. The abundant wildlife included lynx, wildcat, bear, timberwolves, buffalo, deer, prairie chickens, ducks, geese, cranes, and passenger pigeons.

As the county's economy grew, small brickyards were developed. They were especially numerous in Richland, Stuben, and Henry Townships. Coal mining also began in the middle 1800's and continued until the early 1900's. Coal mines were located in Wenona, Toluca, and Sparland. Most mines had been closed by 1930 (Drury). Several railroads built in the 1800's assisted in the development of towns and provided a method of transporting grain and livestock to market.

Figure 1.—Location of Marshall County in Illinois.

Agriculture is the major industry in the county. The towns of Lacon and Henry are river ports for shipping grain via barges on the Illinois River. In 1925, 74,200 acres of corn and less than 100 acres of soybeans were produced. Changes in agriculture since that time have resulted in less production of livestock and the associated pasture and hayland and more production of row crops. In 1995, 95,000 acres of corn and 76,000 acres of soybeans were produced (Illinois Agricultural Statistics, 1995).

Wildlife is still an important part of the county. Along the Illinois River are many shallow lakes, marshlands, swamps, sloughs, and timbered areas. These areas provide natural habitat for game birds, migratory waterfowl, fish, deer, and other wildlife. Hunting is a popular sport in the area. For the 20-year span from 1974 to 1993, the waterfowl harvest averaged 1,460 ducks per year. The deer harvest has increased rapidly over the past 35 years, from 10 deer in 1959 to 595 deer in 1994, as the population of white-tailed deer increased (Marshall-Putnam Cooperative Extension Unit).

Transportation Facilities

The county is crossed by several U.S., state, and county highways. Interstate 39 and state routes 17, 26, 29, 88, and 89 are the major highways. The two railroads and the Illinois River provide additional transportation outlets (fig. 2).

Natural Resources

Marshall County has an abundant supply of sand, gravel, and water. The terraces along the Illinois River have extensive deposits of sand and gravel. The sand that is mined is mainly exported to the Chicago area. Most of the water supply in Marshall County is obtained from sand and gravel aquifers buried deep under glacial till or closer to the surface on river terraces. The Illinois River supplies surface water for backwater lakes, creating good habitat for wildlife.

Native Vegetation

Most of the native vegetation in the survey area has been removed. It was dominantly prairie grasses, such as big bluestem, except in areas near creeks or in the Illinois River valley. In those areas the native vegetation was dominantly oak, hickory, and maple trees.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Lacon in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 25.9 degrees F and the average daily minimum temperature is 17.1 degrees. The lowest temperature on record, which occurred at Lacon on December 23, 1989, is -24 degrees. In summer, the average temperature is 73.4 degrees and the average daily maximum temperature is 85.1 degrees. The highest recorded temperature, which occurred at Lacon on July 22, 1983, is 103 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month,

Figure 2.—The Illinois River provides an inexpensive mode of transportation for grain, which is carried by barge to markets in Chicago or the Gulf of Mexico.

growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 38.2 inches. Of this, 24.2 inches, or about 63 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 5.47 inches recorded at Lacon on July 16, 1997. Thunderstorms occur on about 48 days each year, and most occur in June.

The average seasonal snowfall is 22 inches. The greatest snow depth at any one time during the period of record was 20 inches on February 1, 1979. On the average, 34 days of the year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 11 inches.

The average relative humidity in midafternoon is about 61 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 67 percent of the time possible in summer and 46 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 12.1 miles per hour, in March.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other

living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Some of the soil names in this soil survey do not agree exactly with those in the surveys of Bureau, Putnam, La Salle, Peoria, Woodford, and Stark Counties. Differences are the result of modifications in soil classification or variations in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map in this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Nearly Level Soils on Flood Plains

These soils are on the broad flood plain along the Illinois River and on the narrower flood plains along the adjoining creeks. Most areas are used for crops or as woodland.

1. Radford-Ross-Landes Association

Somewhat poorly drained and well drained soils that formed in silty and loamy alluvium

This association makes up about 5 percent of the county. It is about 25 percent Radford soils, 24 percent Ross soils, 20 percent Landes soils, and 31 percent soils of minor extent. Soils of minor extent include Sawmill, Wea, Martinsville, and Plano soils.

The somewhat poorly drained Radford soils are on the narrow flood plains upstream from the Ross and Landes soils. The typical profile is as follows:

Surface layer:
0 to 7 inches—very dark gray silt loam

Subsurface layer:
7 to 21 inches—very dark gray silt loam

Substratum:
21 to 35 inches—very dark gray, dark grayish brown, and dark brown silt loam

Buried surface layer:
35 to 50 inches—black silty clay loam

Buried subsoil:
50 to 66 inches—light olive gray silty clay loam

Buried substratum:
66 to 80 inches—light olive gray silty clay loam

The well drained Ross soils are on the flood plains downstream from the Radford soils and adjacent to the Landes soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark gray silt loam

Subsurface layer:
9 to 36 inches—very dark gray silt loam

Subsoil:
36 to 48 inches—dark brown loam
48 to 54 inches—brown loam
54 to 65 inches—dark grayish brown, calcareous, stratified silt loam to gravelly loamy sand

Substratum:
65 to 70 inches—calcareous, gravelly loamy sand

The well drained Landes soils are on the flood plains downstream from the Radford soils and adjacent to the Ross soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark grayish brown sandy loam

Subsurface layer:
9 to 20 inches—very dark grayish brown sandy loam

Subsoil:
20 to 26 inches—dark brown sandy loam

26 to 43 inches—dark yellowish brown loamy sand

Substratum:
43 to 80 inches—yellowish brown, calcareous loam to sand

2. Moundprairie-Slacwater Association

Poorly drained soils that formed in silty and clayey alluvium

This association makes up about 2 percent of the county. It is about 48 percent Moundprairie soils, 40 percent Slacwater soils, and 12 percent soils of minor extent (fig. 3). Soils of minor extent include Raveenwash and Sawmill soils.

Moundprairie soils are on the flood plain along the Illinois River. They occur most commonly as islands or areas adjacent to the Slacwater soils. The typical profile is as follows:

Surface layer:
0 to 10 inches—very dark gray and very dark grayish brown, calcareous silty clay loam with lenses of loam and silt loam

Substratum:
10 to 48 inches—very dark gray and olive brown, calcareous silty clay loam

Buried surface layer:
48 to 80 inches—black, calcareous silty clay loam

Slacwater soils are on the flood plain along the Illinois River. They occur most commonly on deltas at the mouths of creeks or are adjacent to the Moundprairie soils. The typical profile is as follows:

Surface layer:
0 to 6 inches—very dark gray, calcareous silt loam

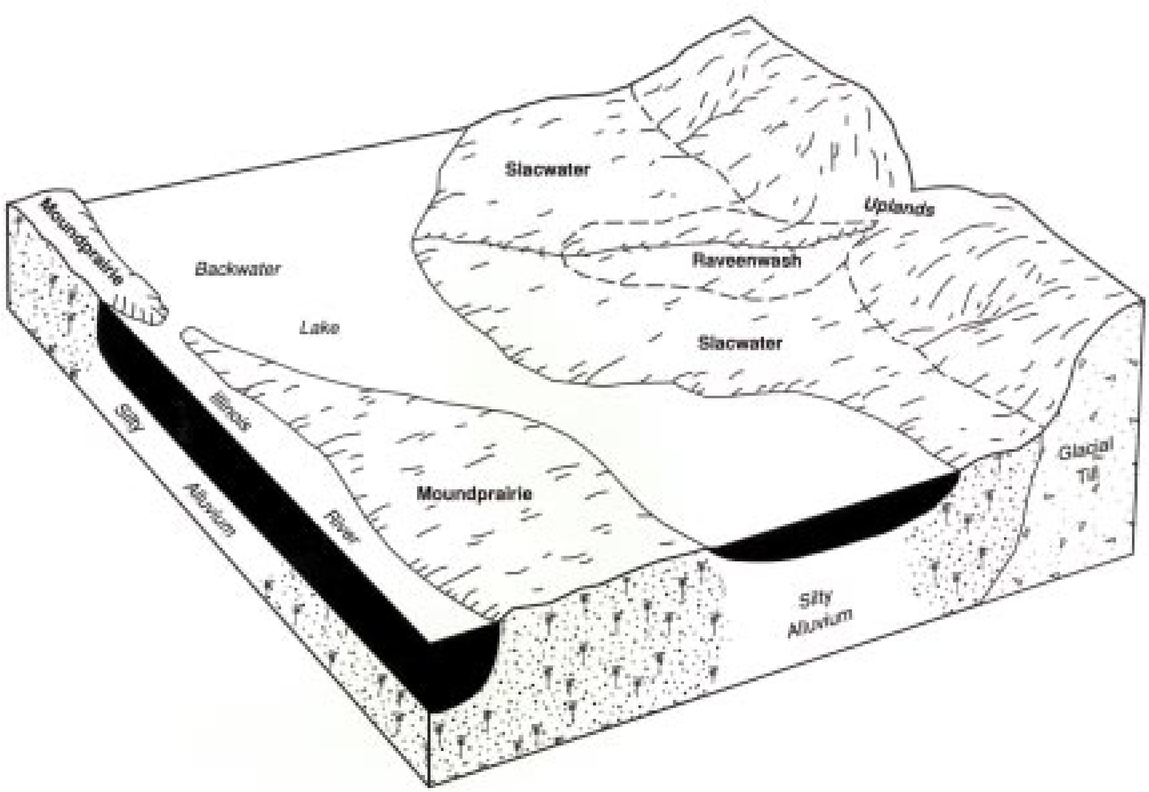

Figure 3.—Typical pattern of soils and parent material in the Moundprairie-Slacwater association.

Substratum:
6 to 20 inches—dark grayish brown and very dark gray, calcareous silt loam
20 to 38 inches—dark grayish brown and very dark gray, calcareous silty clay loam
38 to 60 inches—gray, calcareous silt loam

Nearly Level to Gently Sloping Soils on Terraces

These soils are on river and stream terraces. Most areas are used for crops, but some areas are used for building site development or for mining of sand and gravel.

3. Dakota-Wea Association

Well drained soils that formed in loamy and sandy glacial outwash

This association makes up about 6 percent of the county. It is about 56 percent Dakota soils, 17 percent Wea soils, and 27 percent soils of minor extent. Soils of minor extent include Plano, Rodman, Sparta, Martinsville, and Onarga soils.

Dakota soils are on terraces in positions adjacent to those of the Wea soils. The typical profile is as follows:

Surface layer:
0 to 10 inches—very dark grayish brown loam

Subsurface layer:
10 to 14 inches—very dark grayish brown loam

Subsoil:
14 to 21 inches—dark brown loam
21 to 29 inches—brown loam
29 to 33 inches—brown coarse sandy loam
33 to 37 inches—brown loamy coarse sand

Substratum:
37 to 60 inches—brown coarse sand

Wea soils are on terraces in positions adjacent to those of the Dakota soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark grayish brown silt loam

Subsurface layer:
9 to 13 inches—very dark grayish brown silt loam
13 to 17 inches—dark brown silt loam

Subsoil:
17 to 29 inches—dark yellowish brown loam
29 to 41 inches—brown gravelly loam
41 to 51 inches—brown gravelly coarse sandy loam

Substratum:
51 to 80 inches—yellowish brown gravelly coarse sand

Nearly Level and Gently Sloping Soils on Till Plains

These soils are on loess-covered till plains. They are used for row crops.

4. Harco-Sable-Elkhart Association

Poorly drained to moderately well drained soils that formed in loess

This association makes up about 12 percent of the county. It is about 52 percent Harco soils, 28 percent Sable soils, 10 percent Elkhart soils, and 10 percent soils of minor extent (fig. 4). Soils of minor extent include Muscatune, Osco, and Flanagan soils.

The somewhat poorly drained Harco soils are in landform positions above those of the Sable soils and below those of the Elkhart soils. The typical profile is as follows:

Surface layer:
0 to 8 inches—black silt loam

Subsurface layer:
8 to 15 inches—black silt loam

Subsoil:
15 to 20 inches—dark grayish brown silty clay loam
20 to 31 inches—grayish brown silty clay loam
31 to 43 inches—grayish brown silt loam

Substratum:
43 to 80 inches—light olive brown, yellowish brown, and light brownish gray silt loam

The poorly drained Sable soils are in landform positions below those of the Harco and Elkhart soils. The typical profile is as follows:

Surface layer:
0 to 8 inches—black silty clay loam

Subsurface layer:
8 to 11 inches—black silty clay loam
11 to 14 inches—very dark gray silty clay loam

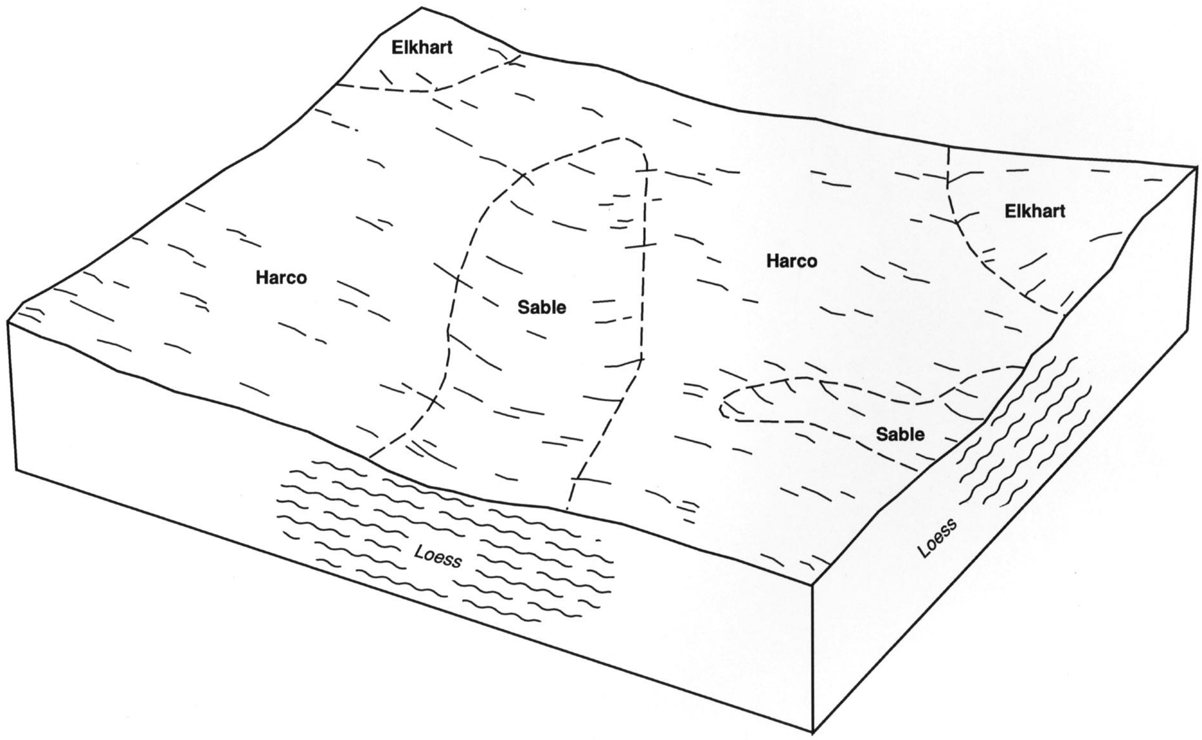

Figure 4.—Typical pattern of soils and parent material in the Harco-Sable-Elkhart association.

Subsoil:
14 to 20 inches—dark gray silty clay loam
20 to 31 inches—grayish brown silty clay loam
31 to 50 inches—gray silty clay loam
50 to 60 inches—gray silt loam

The moderately well drained Elkhart soils are in landform positions above those of the Sable and Harco soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark grayish brown silt loam

Subsurface layer:
9 to 13 inches—very dark grayish brown silt loam

Subsoil:
13 to 21 inches—dark brown silty clay loam
21 to 30 inches—dark yellowish brown silty clay loam
30 to 49 inches—yellowish brown, calcareous silt loam

Substratum:
49 to 80 inches—yellowish brown, calcareous silt loam

5. Muscatune-Osco-Sable Association

Poorly drained to moderately well drained soils that formed in loess

This association makes up about 13 percent of the county. It is about 32 percent Muscatune and similar soils, 29 percent Osco and similar soils, 13 percent Sable soils, and 26 percent soils of minor extent. Soils of minor extent include Catlin, Sawmill, and Saybrook soils.

The somewhat poorly drained Muscatune soils are in landform positions above those of the Sable soils and below those of the Osco soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—black silt loam

Subsurface layer:
9 to 17 inches—black silt loam

Subsoil:
17 to 28 inches—dark grayish brown silty clay loam

28 to 46 inches—grayish brown silty clay loam
46 to 54 inches—grayish brown silt loam

Substratum:
54 to 80 inches—grayish brown, calcareous silt loam

The moderately well drained Osco soils are in landform positions above those of the Sable and Muscatune soils. The typical profile is as follows:

Surface layer:
0 to 8 inches—very dark brown silt loam

Subsurface layer:
8 to 11 inches—very dark grayish brown silt loam

Subsoil:
11 to 29 inches—brown silty clay loam
29 to 43 inches—yellowish brown silty clay loam
43 to 51 inches—yellowish brown silt loam

Substratum:
51 to 80 inches—yellowish brown silt loam

The poorly drained Sable soils are in landform positions below those of the Muscatune and Osco soils. The typical profile is as follows:

Surface layer:
0 to 8 inches—black silty clay loam

Subsurface layer:
8 to 11 inches—black silty clay loam
11 to 14 inches—very dark gray silty clay loam

Subsoil:
14 to 20 inches—dark gray silty clay loam
20 to 31 inches—grayish brown silty clay loam
31 to 50 inches—gray silty clay loam
50 to 80 inches—gray silt loam

Nearly Level to Moderately Sloping Soils on Till Plains

These soils are on loess-covered till plains. They are used for row crops.

6. Rutland-Streator-Wenona Association

Poorly drained to moderately well drained soils that formed in loess and in the underlying silty clay glacial till

This association makes up about 10 percent of the county. It is about 52 percent Rutland soils, 25 percent Streator soils, 17 percent Wenona soils, and 6 percent soils of minor extent. Soils of minor extent include Swygert and Sawmill soils.

The somewhat poorly drained Rutland soils are in landform positions above those of the Streator soils and below those of the Wenona soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—black silt loam

Subsurface layer:
9 to 14 inches—black silt loam

Subsoil:
14 to 21 inches—dark grayish brown silty clay loam
21 to 42 inches—grayish brown silty clay loam
42 to 52 inches—grayish brown silty clay

Substratum:
52 to 80 inches—grayish brown silty clay

The poorly drained Streator soils are in landform positions below those of the Rutland and Wenona soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—black silty clay loam

Subsurface layer:
9 to 13 inches—black silty clay loam

Subsoil:
13 to 17 inches—dark gray silty clay loam
17 to 33 inches—gray silty clay
33 to 42 inches—gray silty clay loam
42 to 68 inches—grayish brown silty clay

Substratum:
68 to 80 inches—grayish brown silty clay

The moderately well drained Wenona soils are in landform positions above those of the Streator and Rutland soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark brown silt loam

Subsoil:
9 to 17 inches—dark brown silty clay loam
17 to 40 inches—brown silty clay loam
40 to 52 inches—grayish brown, calcareous silty clay

Substratum:
52 to 80 inches—olive gray silty clay

7. Flanagan-Graymont-Elpaso Association

Poorly drained to moderately well drained soils that formed in loess and in the underlying silty clay loam glacial till

This association makes up about 16 percent of the county. It is about 30 percent Flanagan soils, 25 percent Graymont soils, 20 percent Elpaso and similar soils, and 25 percent soils of minor extent (fig. 5). Soils of minor extent include Catlin, Varna, and Sawmill soils.

The somewhat poorly drained Flanagan soils are in landform positions above those of the Elpaso soils and below those of the Graymont soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark gray silt loam

Subsurface layer:
9 to 13 inches—very dark gray silt loam

Subsoil:
13 to 18 inches—dark grayish brown silty clay loam
18 to 42 inches—brown silty clay loam
42 to 46 inches—grayish brown silty clay loam
46 to 56 inches—grayish brown, calcareous silty clay loam

Substratum:
56 to 80 inches—olive brown, calcareous silty clay loam

The moderately well drained Graymont soils are in landform positions above those of the Elpaso and Flanagan soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark grayish brown silty clay loam

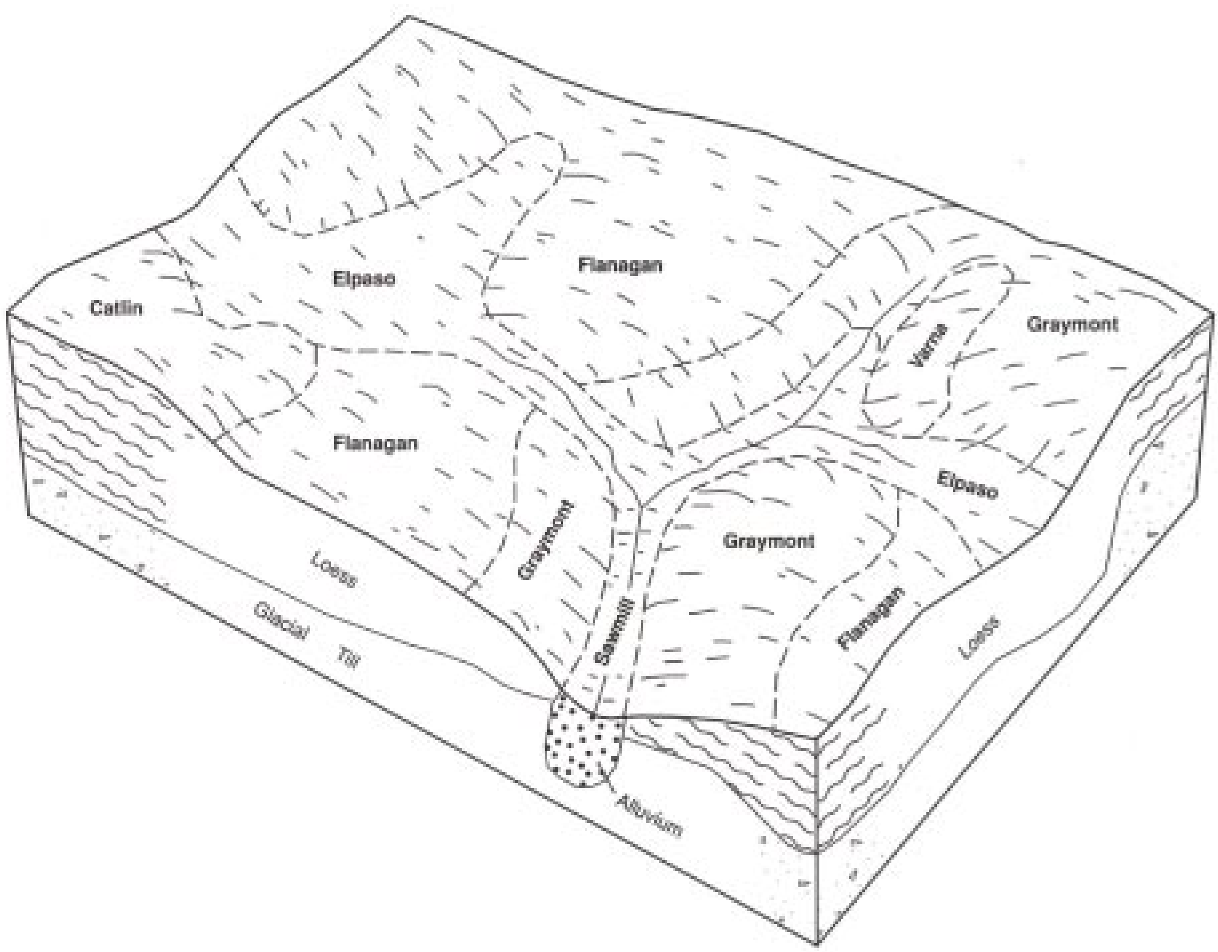

Figure 5.—Typical pattern of soils and parent material in the Flanagan-Graymont-Elpaso association.

Subsoil:
9 to 14 inches—dark yellowish brown silty clay loam
14 to 29 inches—yellowish brown silty clay loam
29 to 43 inches—light olive brown, calcareous silty clay loam

Substratum:
43 to 60 inches—light olive brown, calcareous silty clay loam

The poorly drained Elpaso soils are in landform positions below those of the Flanagan and Graymont soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark gray silty clay loam

Subsurface layer:
9 to 19 inches—black silty clay loam

Subsoil:
19 to 24 inches—dark grayish brown silty clay loam
24 to 35 inches—grayish brown silty clay loam
35 to 61 inches—light brownish gray silty clay loam

Substratum:
61 to 80 inches—light olive brown, calcareous silty clay loam

8. Catlin-Saybrook-Osco Association

Moderately well drained soils that formed in loess or in loess and the underlying loam or silty clay loam glacial till

This association makes up about 12 percent of the county. It is about 32 percent Catlin soils, 26 percent Saybrook soils, 17 percent Osco and similar soils, and 25 percent soils of minor extent (fig. 6). Soils of minor extent include Radford, Muscatune, La Rose, and Sable soils.

Catlin soils are in landform positions adjacent to those of the Saybrook and Osco soils. The typical profile is as follows:

Surface layer:
0 to 9 inches—very dark gray silt loam

Subsurface layer:
9 to 16 inches—very dark grayish brown silt loam

Subsoil:
16 to 23 inches—brown silty clay loam
23 to 38 inches—dark yellowish brown silty clay loam
38 to 46 inches—yellowish brown silt loam
46 to 53 inches—light olive brown, calcareous silty clay loam

Substratum:
53 to 80 inches—light olive brown, calcareous silty clay loam

Saybrook soils are in landform positions adjacent to those of the Catlin and Osco soils. The typical profile is as follows:

Surface layer:
0 to 8 inches—very dark grayish brown silty clay loam

Subsoil:
8 to 19 inches—dark yellowish brown silty clay loam
19 to 27 inches—yellowish brown silty clay loam
27 to 35 inches—brown silty clay loam
35 to 57 inches—brown, calcareous loam

Substratum:
57 to 80 inches—brown, calcareous loam

Osco soils are in landform positions adjacent to those of the Saybrook and Catlin soils. The typical profile is as follows:

Surface layer:
0 to 8 inches—very dark brown silt loam

Subsurface layer:
8 to 11 inches—very dark grayish brown silt loam

Subsoil:
11 to 29 inches—brown silty clay loam
29 to 43 inches—yellowish brown silty clay loam
43 to 51 inches—yellowish brown silt loam

Substratum:
51 to 60 inches—yellowish brown silt loam

Nearly Level to Very Steep Soils on Till Plains

These soils are on loess-covered till plains. They are used for row crops, pasture, hayland, or woodland.

9. Hennepin-Birkbeck-Senachwine Association

Well drained and moderately well drained soils that formed in loess or in loess and the underlying loam, clay loam, or silty clay loam glacial till

This association makes up about 17 percent of the county. It is about 33 percent Hennepin and similar

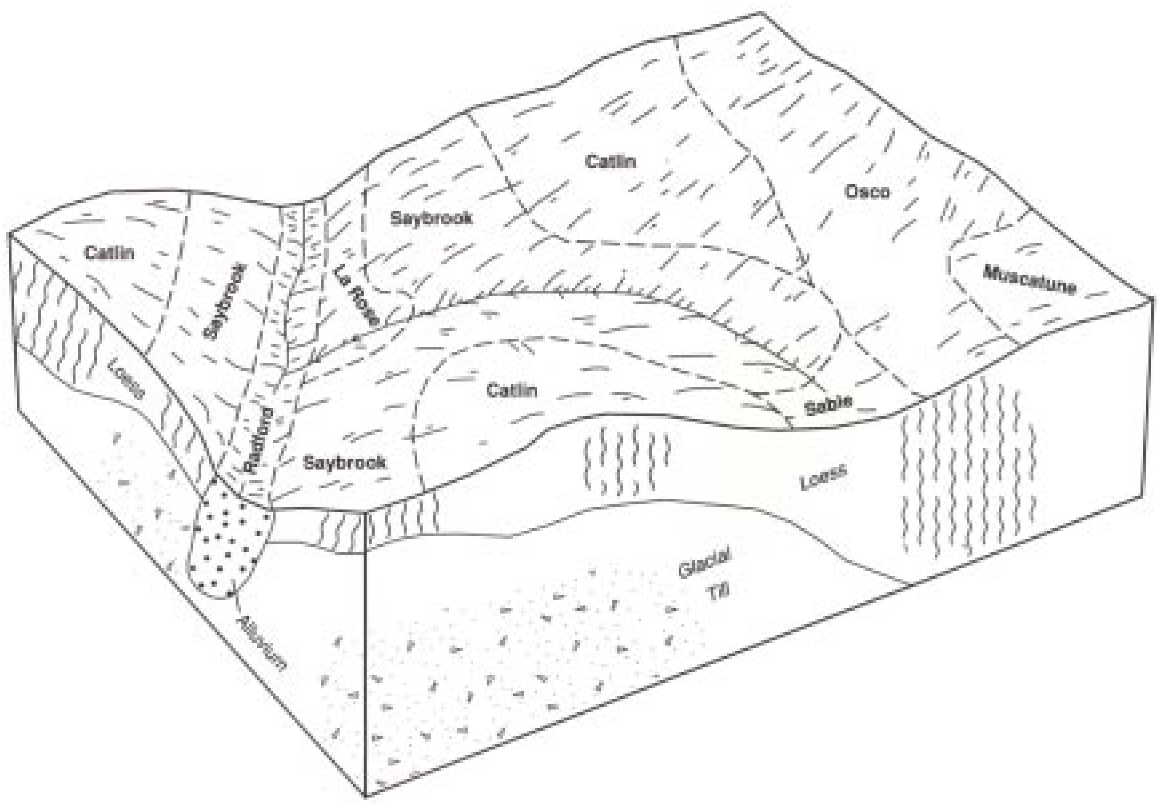

Figure 6.—Typical pattern of soils and parent material in the Catlin-Saybrook-Osco association.

soils, 32 percent Birkbeck and similar soils, 16 percent Senachwine soils, and 19 percent soils of minor extent (fig. 7). Soils of minor extent include Rozetta, Fayette, and Radford soils.

The well drained Hennepin soils are in landform positions below those of the Birkbeck and Senachwine soils. The typical profile is as follows:

Surface layer:

0 to 3 inches—very dark grayish brown loam

Subsoil:

3 to 5 inches—dark brown loam

5 to 16 inches—dark yellowish brown, calcareous loam

Substratum:

16 to 80 inches—brown, calcareous loam

The moderately well drained Birkbeck soils are in landform positions above those of the Hennepin and Senachwine soils. The typical profile is as follows:

Surface layer:

0 to 9 inches—brown silty clay loam

Subsoil:

9 to 44 inches—yellowish brown silty clay loam

44 to 54 inches—yellowish brown, calcareous silt loam

54 to 60 inches—light olive brown, calcareous silty clay loam

Substratum:

60 to 70 inches—light olive brown, calcareous silty clay loam

The well drained Senachwine soils are in landform positions below those of the Birkbeck soils and above

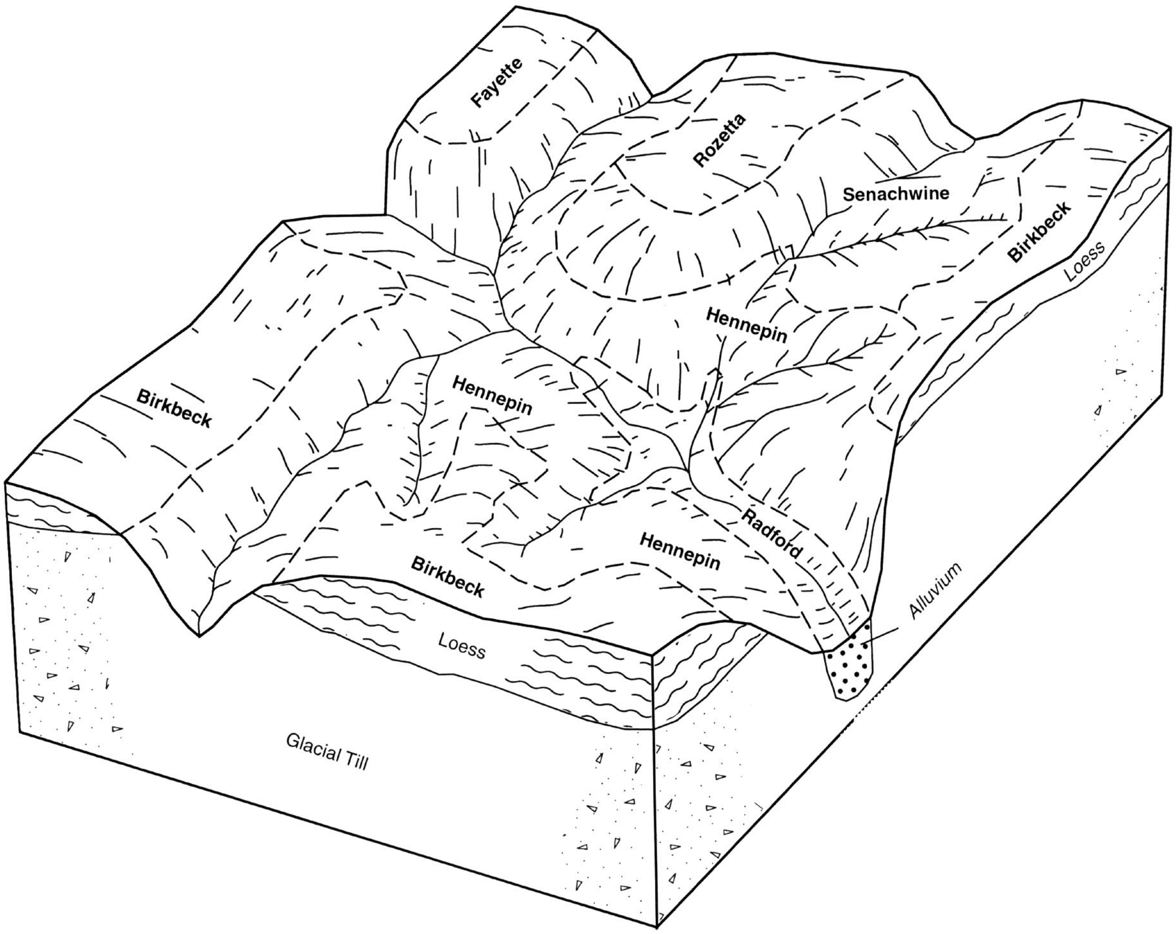

Figure 7.—Typical pattern of soils and parent material in the Hennepin-Birkbeck-Senachwine association.

those of the Hennepin soils. The typical profile is as follows:

Surface layer:

0 to 5 inches—mixed dark brown and dark yellowish brown silt loam

Subsoil:

5 to 12 inches—dark yellowish brown silty clay loam

12 to 32 inches—brown clay loam

32 to 37 inches—brown, calcareous clay loam

Substratum:

37 to 80 inches—brown, calcareous loam

10. Rozetta-Keomah Association

Moderately well drained and somewhat poorly drained soils that formed in loess

This association makes up about 7 percent of the county. It is about 47 percent Rozetta soils, 31 percent Keomah soils, and 22 percent soils of minor extent (fig. 8). Soils of minor extent include Hennepin, Clarksdale, Fayette, and Birkbeck soils.

The moderately well drained Rozetta soils are in landform positions above those of the Keomah soils. The typical profile is as follows:

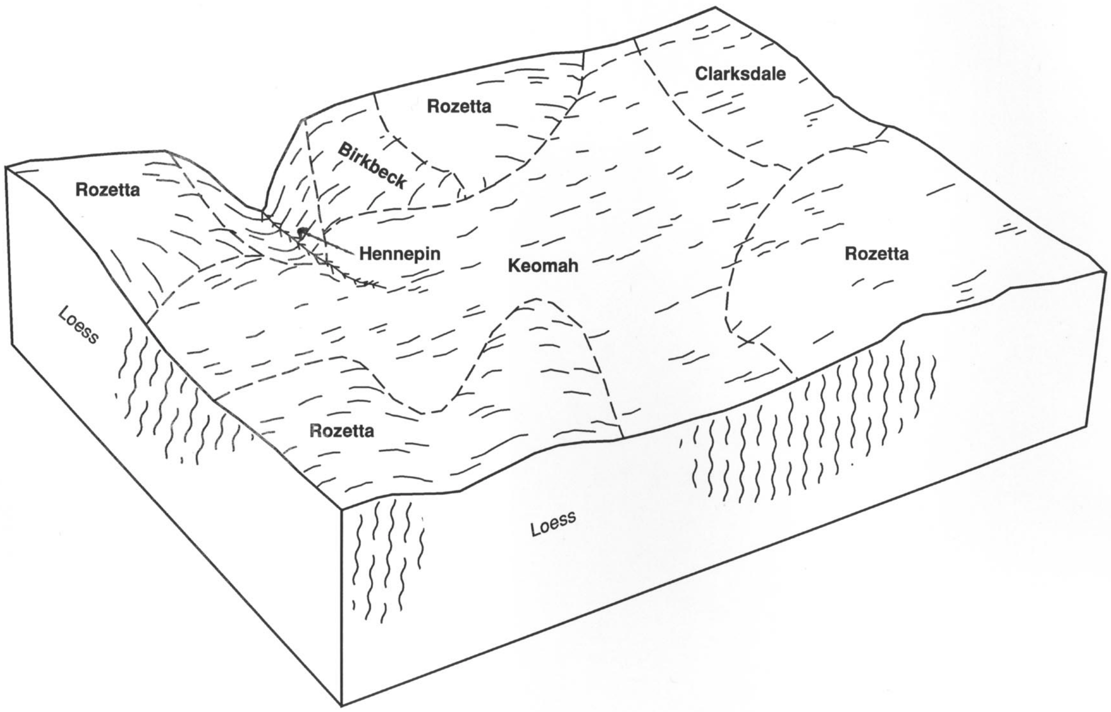

Figure 8.—Typical pattern of soils and parent material in the Rozetta-Keomah association.

Surface layer:
0 to 7 inches—dark brown silt loam

Subsoil:
7 to 10 inches—dark brown silt loam
10 to 18 inches—dark yellowish brown silty clay loam
18 to 57 inches—yellowish brown silty clay loam

Substratum:
57 to 80 inches—yellowish brown silt loam

The somewhat poorly drained Keomah soils are in landform positions below those of the Rozetta soils. The typical profile is as follows:

Surface layer:
0 to 10 inches—dark grayish brown silt loam

Subsurface layer:
10 to 13 inches—grayish brown silt loam

Subsoil:
13 to 16 inches—dark grayish brown silty clay loam
16 to 23 inches—dark yellowish brown silty clay
23 to 34 inches—olive brown silty clay loam
34 to 40 inches—light olive brown silty clay loam
40 to 55 inches—light brownish gray and yellowish brown, calcareous silt loam

Substratum:
55 to 80 inches—light brownish gray and yellowish brown, calcareous silt loam

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some “included” areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a ***soil series***. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into ***soil phases***. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Rozetta silt loam, 2 to 5 percent slopes, is a phase of the Rozetta series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A ***complex*** consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Senachwine-Hennepin complex, 25 to 35 percent slopes, is an example.

This survey includes ***miscellaneous areas***. Such areas have little or no soil material and support little or

no vegetation. The map unit Pits, gravel, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

17A—Keomah silt loam, 0 to 2 percent slopes

Composition

Keomah soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 10 inches—dark grayish brown silt loam

Subsurface layer:
10 to 13 inches—grayish brown silt loam

Subsoil:
13 to 16 inches—dark grayish brown silty clay loam
16 to 23 inches—dark yellowish brown silty clay
23 to 34 inches—olive brown silty clay loam
34 to 40 inches—light olive brown silty clay loam
40 to 55 inches—light brownish gray and yellowish brown, calcareous silt loam

Substratum:
55 to 80 inches—light brownish gray and yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow or moderately slow
Parent material: Loess
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 to 1.0 foot
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- The seasonal high water table is a concern. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited

Woodland

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
- The seasonal high water table is a concern. Installing tile drains around the footings can lower the water table.
- The shrink-swell potential is a limitation. Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Onsite investigation is recommended.

Septic tank absorption fields

Suitability: Poor
Management considerations:
- The restricted permeability and the seasonal high water table are concerns. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

17B2—Keomah silt loam, 2 to 5 percent slopes, eroded

Composition

Keomah soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 6 inches—dark grayish brown silt loam

Subsurface layer:
6 to 9 inches—grayish brown silty clay loam

Subsoil:
9 to 16 inches—brown silty clay
16 to 36 inches—light olive brown silty clay loam
36 to 47 inches—light brownish gray and yellowish brown silt loam

Substratum:
47 to 80 inches—light brownish gray and yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow or moderately slow
Parent material: Loess
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 0.5 to 1.0 foot
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Inclusions

• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a concern. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Including forage crops in the rotation, using a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• The seasonal high water table is a concern. Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• Onsite investigation is recommended.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high water table are concerns. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

19C3—Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded

Composition

Sylvan soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—brown silty clay loam

Subsoil:
9 to 15 inches—yellowish brown silty clay loam
15 to 20 inches—brown silty clay loam

Substratum:
20 to 60 inches—light brownish gray, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Rapid
Available water capacity: Very high
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- The shrink-swell potential is a limitation. Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability is a limitation. Onsite investigation is required. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 4e
Farmland classification: Farmland of statewide importance

19D3—Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded

Composition

Sylvan soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Pasture or hay

Typical Profile

Surface layer:
0 to 5 inches—brown silty clay loam

Subsoil:
5 to 11 inches—dark yellowish brown silty clay loam
11 to 21 inches—yellowish brown silty clay loam
21 to 30 inches—yellowish brown silt loam
30 to 80 inches—yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Rapid
Available water capacity: Very high
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Very severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Poor
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- The shrink-swell potential is a limitation. Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- Strengthening or replacing the base material helps to overcome the low bearing strength and the potential for frost action.

Interpretive Groups

Land capability classification: 4e
Farmland classification: Farmland of statewide importance

24C2—Dodge silt loam, 5 to 10 percent slopes, eroded

Composition

Dodge soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—brown silt loam

Subsoil:
7 to 25 inches—yellowish brown silty clay loam
25 to 30 inches—yellowish brown silt loam
30 to 35 inches—brown clay loam
35 to 39 inches—brown loam

Substratum:
39 to 60 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have more clay in the subsoil
- Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- The shrink-swell potential is a limitation. Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability and the slope are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

24D2—Dodge silt loam, 10 to 15 percent slopes, eroded

Composition

Dodge soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Pasture or hay

Typical Profile

Surface layer:
0 to 6 inches—brown silt loam

Subsurface layer:
6 to 9 inches—brown silty clay loam

Subsoil:
9 to 32 inches—yellowish brown silty clay loam
32 to 38 inches—brown clay loam
38 to 52 inches—brown, calcareous loam

Substratum:
52 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Low
Erosion hazard: Very severe
Shrink-swell potential: Moderate

Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that are shallower over glacial till
- Soils that have carbonates closer to the surface

Use and Management

Cropland

Suitability: Poor
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- The shrink-swell potential is a limitation. Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability and the slope are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 4e
Farmland classification: Farmland of statewide importance

25G—Hennepin loam, 35 to 60 percent slopes

Composition

Hennepin soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Woodland

Typical Profile

Surface layer:
0 to 3 inches—very dark grayish brown loam

Subsoil:
3 to 5 inches—dark brown loam
5 to 16 inches—dark yellowish brown, calcareous loam

Substratum:
16 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Glacial till
Runoff: Very rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Very severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

- Soils that have carbonates at a lower depth
- Soils that are deeper over till

Use and Management

Cropland

Suitability: Because of the slope, this soil is not suitable for crops.

Pasture and hay

Suitability: Because of the slope, this soil is not suitable for pasture and hay.

Woodland

Suitability: Poor
Management considerations:
• In the steeper areas, the logs should be skidded uphill with a cable and winch.
• Building logging roads and skid trails on or near the contour and diverting surface water help to control erosion. Seeding all bare areas to grass or a grass-legume mixture after logging has been completed also reduces the hazard of erosion.

Dwellings

Suitability: Because of the slope, this soil is not suitable as a site for dwellings.

Roads and streets

Suitability: Because of the slope, this soil is not suitable as a site for roads and streets.

Interpretive Groups

Land capability classification: 7e
Farmland classification: None

37B—Worthen silt loam, 2 to 5 percent slopes

Composition

Worthen soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Gently sloping terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—black silt loam

Subsurface layer:
8 to 24 inches—very dark grayish brown silt loam

Subsoil:
24 to 34 inches—dark brown silt loam
34 to 47 inches—dark brown silty clay loam
47 to 57 inches—brown loam

Substratum:
57 to 60 inches—dark yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: High

Inclusions

• Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Roads and streets

Suitability: Poor

Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

43A—Ipava silt loam, 0 to 2 percent slopes

Composition

Ipava soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops (fig. 9)

Typical Profile

Surface layer:
0 to 8 inches—black silt loam

Subsurface layer:
8 to 18 inches—black silty clay loam

Subsoil:
18 to 24 inches—olive brown silty clay loam
24 to 33 inches—light olive brown silty clay loam
33 to 49 inches—light olive brown and light brownish gray silty clay loam
49 to 80 inches—light olive brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff: Slow
Available water capacity: Very high

Figure 9.—A field of pumpkins ready to be harvested in an area of Ipava silt loam, 0 to 2 percent slopes.

Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that have carbonates closer to the surface
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
- Installing tile drains around the footings can lower the water table.
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
- The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength, the shrink-swell potential, and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

51A—Muscatune silt loam, 0 to 2 percent slopes

Composition

Muscatune soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—black silt loam

Subsurface layer:
9 to 17 inches—black silt loam

Subsoil:
17 to 28 inches—dark grayish brown silty clay loam
28 to 46 inches—grayish brown silty clay loam
46 to 54 inches—grayish brown silt loam

Substratum:
54 to 80 inches—grayish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff: Slow
Available water capacity: Very high
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that have carbonates closer to the surface
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

60C2—La Rose silty clay loam, 5 to 10 percent slopes, eroded

Composition

La Rose soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown silty clay loam

Subsoil:
7 to 17 inches—dark yellowish brown clay loam
17 to 23 inches—yellowish brown, calcareous loam

Substratum:
23 to 80 inches—yellowish brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

• Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
• The low bearing strength and the shrink-swell potential are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

60D2—La Rose silt loam, 10 to 15 percent slopes, eroded

Composition

La Rose soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 6 inches—dark brown silt loam

Subsoil:
6 to 18 inches—brown clay loam
18 to 25 inches—brown, calcareous clay loam

Substratum:
25 to 60 inches—yellowish brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

• Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
• The low bearing strength and the shrink-swell

potential are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 4e
Farmland classification: Farmland of statewide importance

68A—Sable silty clay loam, 0 to 2 percent slopes

Composition

Sable soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—black silty clay loam

Subsurface layer:
8 to 11 inches—black silty clay loam
11 to 14 inches—very dark gray silty clay loam

Subsoil:
14 to 20 inches—dark gray silty clay loam
20 to 31 inches—grayish brown silty clay loam
31 to 50 inches—gray silty clay loam
50 to 80 inches—gray silt loam

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thicker surface layer
- Soils that have carbonates closer to the surface
- Soil that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Because of the ponding, wetness may delay planting or interfere with harvesting in many years. Surface ditches, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
- Because of the ponding, wetness may interfere with the harvesting of hay. Deferring grazing during wet periods helps to keep the plants in good condition and minimizes compaction and the formation of ruts.

Dwellings

Suitability: Poor
Management considerations:
- Adding several feet of suitable loamy material to the site, installing tile drains around the footings, and installing surface drains can lower the water table. Suitable tile outlets are needed. Grading and land shaping help to divert surface water from the site.

Septic tank absorption fields

Suitability: Poor
Management considerations:
- Ponding is a hazard. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- Providing open ditches, which remove excess water, and raising the roadbed with proper fill material help to overcome the ponding and the seasonal high water table.
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

86B—Osco silt loam, 2 to 5 percent slopes

Composition

Osco soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark brown silt loam

Subsurface layer:
8 to 11 inches—very dark grayish brown silt loam

Subsoil:
11 to 29 inches—brown silty clay loam
29 to 43 inches—yellowish brown silty clay loam
43 to 51 inches—yellowish brown silt loam

Substratum:
51 to 80 inches—yellowish brown silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have carbonates closer to the surface
- Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting (fig. 10), farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• Installing tile drains around the footings can lower the water table on sites for houses with basements.

Septic tank absorption fields

Suitability: Moderate
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

86B2—Osco silty clay loam, 2 to 5 percent slopes, eroded

Composition

Osco soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown and dark brown silty clay loam

Figure 10.—No-till corn in soybean stubble in an area of Osco silt loam, 2 to 5 percent slopes.

Subsoil:

9 to 14 inches—dark brown silty clay loam
14 to 30 inches—dark yellowish brown silty clay loam
30 to 39 inches—yellowish brown silty clay loam
39 to 80 inches—yellowish brown silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have carbonates closer to the surface
- Soils that have a thicker surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.

• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• The seasonal high water table is a concern on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

86C2—Osco silty clay loam, 5 to 10 percent slopes, eroded

Composition

Osco soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown silty clay loam

Subsurface layer:
5 to 9 inches—dark brown silty clay loam

Subsoil:
9 to 21 inches—dark brown silty clay loam
21 to 30 inches—dark yellowish brown silt loam
30 to 45 inches—yellowish brown silt loam
45 to 80 inches—yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Rapid
Available water capacity: Very high
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have carbonates closer to the surface
• Soils that have a thicker surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer

help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• The seasonal high water table is a concern on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

88C2—Sparta loamy sand, 7 to 15 percent slopes, eroded

Composition

Sparta soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Terrace side slopes
Major use: Pasture or hay

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown loamy sand

Subsoil:
9 to 13 inches—brown loamy sand
13 to 36 inches—strong brown sand

Substratum:
36 to 80 inches—yellowish brown, calcareous sand

Soil Properties and Qualities

Drainage class: Excessively drained
Permeability: Rapid
Parent material: Eolian deposits
Runoff: Medium
Available water capacity: Low
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Low

Inclusions

• Soils that have more clay in the subsoil
• Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Poor
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface help to control soil blowing and conserve soil moisture. Irrigation can help to overcome the limited available water capacity.
• Adding organic material to the soil increases the available water capacity and improves fertility.

Pasture and hay

Suitability: Poor
Management considerations:
• Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation help to maintain plant quality.
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Moderate
Management considerations:
• Droughtiness is a limitation. Planting in furrows, mulching, and selecting seedlings that are adapted to drier soil conditions reduce the seedling mortality rate

and help to control competition from undesirable species.

Dwellings

Suitability: Moderate
Management considerations:
• Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Because the rapid permeability increases the risk of ground-water contamination, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
• Cutting, filling, and land shaping help to overcome the slope.
• The high content of sand affects dirt roads.

Interpretive Groups

Land capability classification: 6s
Farmland classification: Farmland of statewide importance

91B2—Swygert silty clay loam, 2 to 5 percent slopes, eroded

Composition

Swygert soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark gray and brown silty clay loam

Subsoil:
8 to 12 inches—brown silty clay loam
12 to 23 inches—brown silty clay
23 to 45 inches—brown, calcareous silty clay

Substratum:
45 to 80 inches—grayish brown, calcareous silty clay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Parent material: Loess over glacial till
Runoff: Slow to rapid
Available water capacity: Low
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Inclusions

• Soils that are deeper over glacial till
• Soils that have carbonates closer to the surface

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength, the shrink-swell potential, and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

93G—Rodman gravelly sandy loam, 20 to 70 percent slopes

Composition

Rodman soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Breaks on terraces and flood plains
Major use: Woodland

Typical Profile

Surface layer:
0 to 7 inches—black gravelly sandy loam

Subsoil:
7 to 13 inches—dark brown gravelly sandy loam

Substratum:
13 to 18 inches—brown, calcareous sand and gravel
18 to 80 inches—yellowish brown, calcareous sand and gravel

Soil Properties and Qualities

Drainage class: Excessively drained
Permeability: Moderately rapid in the upper part and very rapid in the lower part
Parent material: Outwash
Runoff: Very rapid
Available water capacity: Very low
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Very severe
Shrink-swell potential: Low
Potential for frost action: Low

Inclusions

• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Because of the slope, this soil is not suited to crops.

Pasture and hay

Suitability: Because of the slope, this soil is not suited to pasture and hay.

Woodland

Suitability: Poor
Management considerations:
• Building logging roads and skid trails on or near the contour and diverting surface water help to control erosion. Seeding all bare areas to grass or a grass-legume mixture after logging has been completed also reduces the hazard of erosion.
• Droughtiness is a limitation. Planting in furrows, mulching, and selecting seedlings that are adapted to drier soil conditions reduce the seedling mortality rate and eliminate competition from undesirable species.
• In the steeper areas, the logs should be skidded uphill with a cable and winch.

Dwellings

Suitability: Because of the slope, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the slope, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Because of the slope, this soil is not suited to use as a site for roads and streets.

Interpretive Groups

Land capability classification: 7s
Farmland classification: None

145B2—Saybrook silty clay loam, 2 to 5 percent slopes, eroded

Composition

Saybrook soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown silty clay loam

Subsoil:
8 to 19 inches—dark yellowish brown silty clay loam
19 to 27 inches—yellowish brown silty clay loam
27 to 35 inches—brown silty clay loam
35 to 57 inches—brown, calcareous loam

Substratum:
57 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are deeper over glacial till
- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Well suited
Management considerations:
- Installing tile drains around the footings can lower the water table on sites for houses with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

145C2—Saybrook silty clay loam, 5 to 10 percent slopes, eroded

Composition

Saybrook soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown silty clay loam

Subsoil:
8 to 19 inches—brown silty clay loam
19 to 30 inches—yellowish brown silty clay loam
30 to 37 inches—brown clay loam
37 to 59 inches—brown, calcareous clay loam

Substratum:
59 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are deeper over glacial till
- Soils that are shallower over glacial till
- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Well suited
Management considerations:
- Installing tile drains around the footings can lower the water table on sites for houses with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

148B—Proctor silt loam, 2 to 5 percent slopes

Composition

Proctor soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on terraces and outwash plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown silt loam

Subsurface layer:
8 to 12 inches—very dark grayish brown silt loam

Subsoil:
12 to 29 inches—dark yellowish brown silty clay loam
29 to 35 inches—dark yellowish brown sandy clay loam
35 to 60 inches—dark yellowish brown, stratified sandy loam and loamy sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess over glacial outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are deeper over glacial outwash

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Well suited

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

150A—Onarga sandy loam, 0 to 2 percent slopes

Composition

Onarga soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Nearly level terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown sandy loam

Subsurface layer:
8 to 12 inches—very dark grayish brown sandy loam

Subsoil:
12 to 28 inches—dark yellowish brown sandy loam
28 to 48 inches—dark yellowish brown loamy sand

Substratum:
48 to 68 inches—dark yellowish brown loamy sand
68 to 80 inches—yellowish brown, calcareous gravelly sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Eolian deposits
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

- Soils that have more clay in the subsoil
- Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Moderate

Management considerations:
• Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface help to control soil blowing and conserve soil moisture. Irrigation can help to overcome the limited available water capacity.
• Adding organic material to the soil increases the available water capacity and improves fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation help to maintain plant quality.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poor
Management considerations:
• Because of the poor filtering capacity of this soil, the effluent in septic tank absorption fields may pollute the ground water. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
• Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 2s
Farmland classification: Prime farmland

150C—Onarga sandy loam, 5 to 10 percent slopes

Composition

Onarga soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes of terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 10 inches—very dark grayish brown sandy loam

Subsoil:
10 to 17 inches—brown loam
17 to 23 inches—brown sandy loam
23 to 30 inches—brown loamy sand
30 to 45 inches—brown sand

Substratum:
45 to 80 inches—dark yellowish brown and yellowish brown, calcareous sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Eolian deposits
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

• Soils that have more clay in the subsoil
• Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface help to control soil blowing and conserve soil moisture. Irrigation can help to overcome the limited available water capacity.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil increases the available water capacity and improves fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a

plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation help to maintain plant quality.
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poor
Management considerations:
• Because of the poor filtering capacity of this soil, the effluent in septic tank absorption fields may pollute the ground water. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
• Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Prime farmland

152A—Drummer silty clay loam, 0 to 2 percent slopes

Composition

Drummer soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 10 inches—black silty clay loam

Subsurface layer:
10 to 14 inches—black silty clay loam

Subsoil:
14 to 28 inches—dark grayish brown, mottled silty clay loam
28 to 46 inches—grayish brown, mottled silty clay loam
46 to 53 inches—grayish brown, mottled silt loam
53 to 60 inches—grayish brown, mottled sandy loam that has strata of loam

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess over glacial outwash
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thicker surface layer
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Because of the ponding, wetness may delay planting or interfere with harvesting in many years. Surface ditches, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.
• Applying a system of conservation tillage that leaves crop residue on the surface after planting, including forage crops in the rotation, returning crop residue to the soil, and adding green manure crops or animal manure to the soil help to maintain productivity, improve tilth, and minimize compaction.

Pasture and hay

Suitability: Moderate
Management considerations:
• Because of the ponding, wetness may interfere with the harvesting of hay. Deferring grazing during wet periods helps to keep the plants in good condition and minimizes compaction and the formation of ruts.

Dwellings

Suitability: Poor

Management considerations:
• Adding several feet of suitable loamy material to the site, installing tile drains around the footings, and installing surface drains can lower the water table. Suitable tile outlets are needed. Grading and land shaping help to divert surface water from the site.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• Ponding is a hazard. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• Providing open ditches, which remove excess water, and raising the roadbed with proper fill material help to overcome the ponding and the seasonal high water table.
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

154A—Flanagan silt loam, 0 to 2 percent slopes

Composition

Flanagan soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark gray silt loam

Subsurface layer:
9 to 13 inches—very dark gray silt loam

Subsoil:
13 to 18 inches—dark grayish brown silty clay loam
18 to 42 inches—brown silty clay loam
42 to 46 inches—grayish brown silty clay loam
46 to 56 inches—grayish brown, calcareous silty clay loam

Substratum:
56 to 80 inches—olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

• Soils that have carbonates closer to the surface
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor

Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength, the shrink-swell potential, and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

171B—Catlin silt loam, 2 to 5 percent slopes

Composition

Catlin soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark gray silt loam

Subsurface layer:
9 to 16 inches—very dark grayish brown silt loam

Subsoil:
16 to 23 inches—brown silty clay loam
23 to 38 inches—dark yellowish brown silty clay loam
38 to 46 inches—yellowish brown silt loam
46 to 53 inches—light olive brown, calcareous silty clay loam

Substratum:
53 to 80 inches—light olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thinner surface layer
• Soils that are shallower over glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor

Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

171B2—Catlin silt loam, 2 to 5 percent slopes, eroded

Composition

Catlin soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown silt loam

Subsoil:
9 to 49 inches—brown silty clay loam
49 to 52 inches—brown clay loam

Substratum:
52 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thinner surface layer
• Soils that are shallower over glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

171C2—Catlin silty clay loam, 5 to 10 percent slopes, eroded

Composition

Catlin soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown silty clay loam

Subsoil:
9 to 15 inches—dark brown silty clay loam
15 to 43 inches—brown silty clay loam
43 to 50 inches—light olive brown silty clay loam
50 to 57 inches—light olive brown, calcareous silty clay loam

Substratum:
57 to 80 inches—light olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are shallower over glacial till

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
- Installing tile drains around the footings can lower the water table.
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

194F—Morley silt loam, 25 to 35 percent slopes

Composition

Morley soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Woodland

Typical Profile

Surface layer:
0 to 3 inches—very dark gray silt loam

Subsurface layer:
3 to 7 inches—dark grayish brown silt loam

Subsoil:
7 to 10 inches—dark grayish brown silty clay loam
10 to 18 inches—brown silty clay loam
18 to 28 inches—brown clay loam
28 to 37 inches—olive brown, calcareous clay loam

Substratum:
37 to 80 inches—olive brown, calcareous clay loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow in the upper part and slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

- Soils that are deeper over glacial till
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Because of the slope, this soil is not suited to crops.

Pasture and hay

Suitability: Poor
Management considerations:
- Special equipment and techniques are needed if pasture and hay species are planted or if chemicals and fertilizer are applied. The very steep areas are unsuitable for hay because of limitations affecting harvesting equipment.

Woodland

Suitability: Moderate
Management considerations:
- In the steeper areas, the logs should be skidded uphill with a cable and winch.

Dwellings

Suitability: Poor
Management considerations:
- Cutting, filling, and land shaping help to overcome the slope.
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Poor
Management considerations:
- The slope, the restricted permeability, and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- Cutting, filling, and land shaping help to overcome the slope.
- The low bearing strength, the potential for frost action, and the shrink-swell potential are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 6e
Farmland classification: None

198A—Elburn silt loam, 0 to 2 percent slopes

Composition

Elburn soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Nearly level terraces and outwash plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 6 inches—black silt loam

Subsurface layer:
6 to 13 inches—very dark gray silt loam

Subsoil:
13 to 17 inches—dark brown silty clay loam
17 to 28 inches—dark yellowish brown silty clay loam
28 to 38 inches—light olive brown silty clay loam
38 to 50 inches—light olive brown silt loam

50 to 61 inches—dark yellowish brown sandy loam

Substratum:
61 to 77 inches—yellowish brown and light brownish gray, calcareous loamy sand
77 to 80 inches—dark gray, calcareous silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess over glacial outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

199A—Plano silt loam, 0 to 2 percent slopes

Composition

Plano soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Nearly level terraces and outwash plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown silt loam

Subsurface layer:
8 to 12 inches—very dark grayish brown silt loam

Subsoil:
12 to 21 inches—dark brown silt loam
21 to 28 inches—dark yellowish brown silty clay loam
28 to 56 inches—yellowish brown silty clay loam
56 to 64 inches—yellowish brown loam

Substratum:
64 to 70 inches—yellowish brown loam
70 to 80 inches—yellowish brown, stratified gravelly clay loam and gravelly loamy sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess over glacial outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are shallower over glacial outwash

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- No major limitations affect the use of this soil for crops.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

199B—Plano silt loam, 2 to 5 percent slopes

Composition

Plano soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Terraces and side slopes on outwash plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown silt loam

Subsurface layer:
8 to 15 inches—very dark grayish brown silt loam

Subsoil:
15 to 21 inches—dark yellowish brown silty clay loam
21 to 54 inches—yellowish brown silty clay loam
54 to 66 inches—dark brown clay loam

Substratum:
66 to 80 inches—dark yellowish brown, stratified gravelly clay loam, loam, and sandy loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess over glacial outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: High
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that are shallower over glacial outwash

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Well suited

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

223B2—Varna silty clay loam, 2 to 5 percent slopes, eroded

Composition

Varna soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—mixed very dark grayish brown and dark yellowish brown silty clay loam

Subsoil:
7 to 15 inches—dark yellowish brown silty clay
15 to 29 inches—olive brown silty clay
29 to 75 inches—light olive brown, calcareous silty clay loam

Substratum:
75 to 80 inches—light olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have less clay in the subsoil
• Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate

Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

223C2—Varna silty clay loam, 5 to 10 percent slopes, eroded

Composition

Varna soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark grayish brown and dark yellowish brown silty clay loam

Subsoil:
8 to 14 inches—dark yellowish brown silty clay loam
14 to 33 inches—olive brown silty clay
33 to 43 inches—olive brown, calcareous silty clay loam

Substratum:
43 to 80 inches—olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have less clay in the subsoil
• Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost

action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

224D3—Strawn silty clay loam, 10 to 15 percent slopes, severely eroded

Composition

Strawn soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Pasture or hay

Typical Profile

Surface layer:
0 to 6 inches—dark brown silty clay loam

Subsoil:
6 to 21 inches—brown clay loam
21 to 45 inches—brown, calcareous loam

Substratum:
45 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Low
Erosion hazard: Very severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

- Soils that have carbonates closer to the surface
- Soils that have carbonates at a lower depth

Use and Management

Cropland

Suitability: Poor
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.
• Cutting, filling, and land shaping help to overcome the slope.

Interpretive Groups

Land capability classification: 4e
Farmland classification: Farmland of statewide importance

224E—Strawn silt loam, 15 to 25 percent slopes

Composition

Strawn soil and similar inclusions: 75 to 80 percent
Contrasting inclusions: 20 to 25 percent

Setting

Landform position: Side slopes on till plains
Major use: Woodland

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown silt loam

Subsoil:
5 to 20 inches—brown silty clay loam
20 to 24 inches—brown, calcareous clay loam

Substratum:
24 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Glacial till
Runoff: Very rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Very severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

- Soils that have carbonates closer to the surface
- Soils that have carbonates at a lower depth
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Because of the slope, this soil is not suited to crops.

Pasture and hay

Suitability: Poor
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.
- Special equipment and techniques are needed if hay and pasture species are planted or if chemicals and fertilizer are applied. The very steep areas are unsuitable for hay because of limitations affecting the use of harvesting equipment.

Woodland

Suitability: Moderate
Management considerations:
- Building logging roads and skid trails on or near the contour and diverting surface water help to control erosion. Seeding all bare areas to grass or a grass-legume mixture after logging has been completed also reduces the hazard of erosion.

Dwellings

Suitability: Poor
Management considerations:
- Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Poor
Management considerations:
- The slope and the restricted permeability are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- Cutting, filling, and land shaping help to overcome the slope.

Interpretive Groups

Land capability classification: 6e
Farmland classification: None

233B—Birkbeck silt loam, 2 to 5 percent slopes

Composition

Birkbeck soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—brown silt loam

Subsoil:
7 to 47 inches—yellowish brown silty clay loam
47 to 55 inches—brown clay loam

Substratum:
55 to 60 inches—brown clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

233B2—Birkbeck silty clay loam, 2 to 5 percent slopes, eroded

Composition

Birkbeck soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown and dark yellowish brown silty clay loam

Subsoil:
8 to 49 inches—yellowish brown silty clay loam
49 to 63 inches—light olive brown, calcareous loam

Substratum:
63 to 70 inches—light olive brown, calcareous loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid

Available water capacity: Very high
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are shallower over glacial till
- Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

233C2—Birkbeck silty clay loam, 5 to 10 percent slopes, eroded

Composition

Birkbeck soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—brown silty clay loam

Subsoil:
9 to 44 inches—yellowish brown silty clay loam
44 to 54 inches—yellowish brown, calcareous silt loam
54 to 60 inches—light olive brown, calcareous silty clay loam

Substratum:
60 to 70 inches—light olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: Very high
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are shallower over glacial till
- Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

236A—Sabina silt loam, 0 to 2 percent slopes

Composition

Sabina soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown and grayish brown silt loam

Subsurface layer:
8 to 11 inches—grayish brown silt loam

Subsoil:
11 to 15 inches—brown silty clay loam
15 to 52 inches—grayish brown silty clay loam
52 to 80 inches—brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess over glacial till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

- Soils that are deeper over glacial till
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength, the shrink-swell potential, and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

243B—St. Charles silt loam, 2 to 5 percent slopes

Composition

St. Charles soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown silt loam

Subsurface layer:
7 to 12 inches—brown silt loam

Subsoil:
12 to 17 inches—brown silty clay loam
17 to 51 inches—yellowish brown silty clay loam
51 to 60 inches—yellowish brown loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess over glacial outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thinner surface layer
• Soils that are shallower over glacial outwash

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Well suited

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

244A—Hartsburg silty clay loam, 0 to 2 percent slopes

Composition

Hartsburg soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—black silty clay loam

Subsurface layer:
9 to 17 inches—very dark gray silty clay loam

Subsoil:
17 to 24 inches—dark gray silty clay loam
24 to 32 inches—olive gray silty clay loam
32 to 49 inches—light olive gray silty clay loam

Substratum:
49 to 75 inches—light olive gray, calcareous silt loam

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have carbonates at a lower depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Because of the ponding, wetness may delay planting or interfere with harvesting in many years (fig. 11). Surface ditches, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Because of the ponding, wetness may interfere with the harvesting of hay. Deferring grazing during wet periods helps to keep the plants in good condition and minimizes compaction and the formation of ruts.

Dwellings

Suitability: Poor
Management considerations:
• Adding several feet of suitable loamy material to the site, installing tile drains around the footings, and installing surface drains can lower the water table.

Figure 11.—Ponding in an area of Hartsburg silty clay loam, 0 to 2 percent slopes. In many years the ponding delays planting.

Suitable tile outlets are needed. Grading and land shaping help to divert surface water from the site.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• Ponding is a hazard. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• Providing open ditches, which remove excess water, and raising the roadbed with proper fill material help to overcome the ponding and the seasonal high water table.
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

257A—Clarksdale silt loam, 0 to 2 percent slopes

Composition

Clarksdale soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown and grayish brown silt loam

Subsurface layer:
8 to 11 inches—grayish brown silt loam

Subsoil:
11 to 16 inches—brown silty clay loam
16 to 32 inches—grayish brown silty clay loam
32 to 41 inches—brown silty clay loam
41 to 52 inches—brown, calcareous silt loam

Substratum:
52 to 80 inches—brown, light gray, and yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Woodland

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength, the potential for frost action, and the shrink-swell potential are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

279B—Rozetta silt loam, 2 to 5 percent slopes

Composition

Rozetta soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—dark brown silt loam

Subsoil:
7 to 10 inches—dark brown silt loam
10 to 18 inches—dark yellowish brown silty clay loam
18 to 57 inches—yellowish brown silty clay loam

Substratum:
57 to 80 inches—yellowish brown silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high

Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

279B2—Rozetta silt loam, 2 to 5 percent slopes, eroded

Composition

Rozetta soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—brown silt loam

Subsoil:
7 to 52 inches—yellowish brown silty clay loam
52 to 68 inches—yellowish brown, calcareous silt loam

Substratum:
68 to 80 inches—yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thicker surface layer
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• Installing tile drains around the footings can lower the water table.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

279C2—Rozetta silt loam, 5 to 10 percent slopes, eroded

Composition

Rozetta soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—brown silt loam

Subsoil:
7 to 33 inches—yellowish brown silty clay loam
33 to 42 inches—yellowish brown silt loam
42 to 52 inches—yellowish brown, calcareous silt loam

Substratum:
52 to 60 inches—light olive brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have carbonates closer to the surface
• Soils that have a thicker surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface

compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded

Composition

Fayette soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 5 inches—brown silt loam

Subsurface layer:
5 to 8 inches—yellowish brown silt loam

Subsoil:
8 to 54 inches—yellowish brown silty clay loam
54 to 73 inches—light olive brown, calcareous silt loam

Substratum:
73 to 75 inches—light yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thicker surface layer
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

280D—Fayette silt loam, 10 to 15 percent slopes

Composition

Fayette soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Pasture or hay

Typical Profile

Surface layer:
0 to 6 inches—dark brown silt loam

Subsurface layer:
6 to 11 inches—yellowish brown silt loam

Subsoil:
11 to 60 inches—dark yellowish brown silty clay loam

Substratum:
60 to 80 inches—yellowish brown silt loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate

Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

356A—Elpaso silty clay loam, 0 to 2 percent slopes

Composition

Elpaso soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark gray silty clay loam

Subsurface layer:
9 to 19 inches—black silty clay loam

Subsoil:
19 to 24 inches—dark grayish brown silty clay loam
24 to 35 inches—grayish brown silty clay loam
35 to 61 inches—light brownish gray silty clay loam

Substratum:
61 to 80 inches—light olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: At the surface to 1 foot below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

• Soils that have carbonates at a lower depth
• Soils that are deeper over glacial till
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Wetness may delay planting or interfere with harvesting in many years. Surface ditches, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Wetness may interfere with the harvesting of hay. Deferring grazing during wet periods helps to keep the plants in good condition and minimizes compaction and the formation of ruts.

Dwellings

Suitability: Poor
Management considerations:
• Adding several feet of suitable loamy material to the site, installing tile drains around the footings, and installing surface drains can lower the water table. Suitable tile outlets are needed. Grading and land shaping help to divert surface water from the site.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high

water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.
• Providing open ditches, which remove excess water, and raising the roadbed with proper fill material help to overcome the seasonal high water table.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

375A—Rutland silt loam, 0 to 2 percent slopes

Composition

Rutland soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—black silt loam

Subsurface layer:
9 to 14 inches—black silt loam

Subsoil:
14 to 21 inches—dark grayish brown silty clay loam
21 to 42 inches—grayish brown silty clay loam
42 to 52 inches—grayish brown silty clay

Substratum:
52 to 60 inches—grayish brown silty clay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Parent material: Loess over glacial till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength, the shrink-swell potential, and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland

375B2—Rutland silty clay loam, 2 to 5 percent slopes, eroded

Composition

Rutland soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—black silty clay loam

Subsoil:
9 to 13 inches—dark brown silty clay loam
13 to 23 inches—dark yellowish brown silty clay
23 to 37 inches—light olive brown silty clay loam
37 to 46 inches—light olive brown, calcareous silty clay
46 to 57 inches—olive brown, calcareous silty clay

Substratum:
57 to 80 inches—olive brown, calcareous silty clay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Inclusions

- Soils that have less clay in the subsoil
- Soils that have a thicker surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength, the shrink-swell potential, and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

379A—Dakota loam, 0 to 2 percent slopes

Composition

Dakota soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Nearly level areas on high terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 10 inches—very dark grayish brown loam

Subsurface layer:
10 to 14 inches—very dark grayish brown loam

Subsoil:
14 to 21 inches—dark brown loam
21 to 29 inches—brown loam
29 to 33 inches—brown coarse sandy loam
33 to 37 inches—brown loamy coarse sand

Substratum:
37 to 60 inches—brown coarse sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Glacial outwash
Runoff: Very slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

- Soils that have less sand in the subsoil
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited (fig. 12)
Management considerations:
- Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface conserve soil moisture. Irrigation can also help to overcome the limited available water capacity.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation help to maintain plant quality.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poor
Management considerations:
- Because of the poor filtering capacity of this soil, the effluent in septic tank absorption fields can pollute the ground water. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2s
Farmland classification: Prime farmland

379B—Dakota loam, 2 to 5 percent slopes

Composition

Dakota soil and similar inclusions: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform position: Nearly level areas on high terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 10 inches—very dark grayish brown loam

Subsoil:
10 to 21 inches—brown clay loam
21 to 30 inches—brown loam
30 to 35 inches—brown loamy coarse sand

Substratum:
35 to 80 inches—yellowish brown coarse sand

Soil Properties and Qualities

Drainage class: Well drained

Figure 12.—A recently harvested wheat field in an area of Dakota loam, 0 to 2 percent slopes. Sparta loamy sand, 7 to 15 percent slopes, eroded, is in the background.

Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Glacial outwash
Runoff: Very slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

- Soils that have less sand in the subsoil
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface conserve soil moisture. Irrigation can also help to overcome the limited available water capacity.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Droughtiness is a limitation. Planting drought-

resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation help to maintain plant quality.
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poor
Management considerations:
• Because of the poor filtering capacity of this soil, the effluent in septic tank absorption fields may pollute the ground water. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

383B—New Vienna silt loam, 2 to 5 percent slopes

Composition

New Vienna soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown silt loam

Subsoil:
8 to 23 inches—dark yellowish brown silty clay loam
23 to 55 inches—yellowish brown silty clay loam

Substratum:
55 to 60 inches—yellowish brown silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thicker dark surface layer
• Soils that have carbonates closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

• Installing tile drains around the footings can lower the water table.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

388B2—Wenona silt loam, 2 to 5 percent slopes, eroded

Composition

Wenona soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark brown silt loam

Subsoil:
9 to 17 inches—dark brown silty clay loam
17 to 40 inches—brown silty clay loam
40 to 52 inches—grayish brown, calcareous silty clay

Substratum:
52 to 80 inches—olive gray silty clay

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: Moderate

Inclusions

• Soils that are shallower over glacial till
• Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor

Management considerations:
• The low bearing strength and the shrink-swell potential are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

399A—Wea silt loam, 0 to 2 percent slopes

Composition

Wea soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Nearly level terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown silt loam

Subsurface layer:
9 to 13 inches—very dark grayish brown silt loam
13 to 17 inches—dark brown silt loam

Subsoil:
17 to 29 inches—dark yellowish brown loam
29 to 41 inches—brown gravelly loam
41 to 51 inches—brown gravelly coarse sandy loam

Substratum:
51 to 80 inches—yellowish brown gravelly coarse sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and very rapid in the lower part
Parent material: Glacial outwash
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

• Soils that have less sand in the subsoil
• Soils that are deeper over gravel

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface conserve soil moisture. Irrigation can also help to overcome the limited available water capacity.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil increases the available water capacity and improves fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation (fig. 13) help to maintain plant quality.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Well suited

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength is a limitation. Strengthening or replacing the base material helps to overcome this limitation.

Interpretive Groups

Land capability classification: 2s
Farmland classification: Prime farmland

399B—Wea silt loam, 2 to 5 percent slopes

Composition

Wea soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on terraces

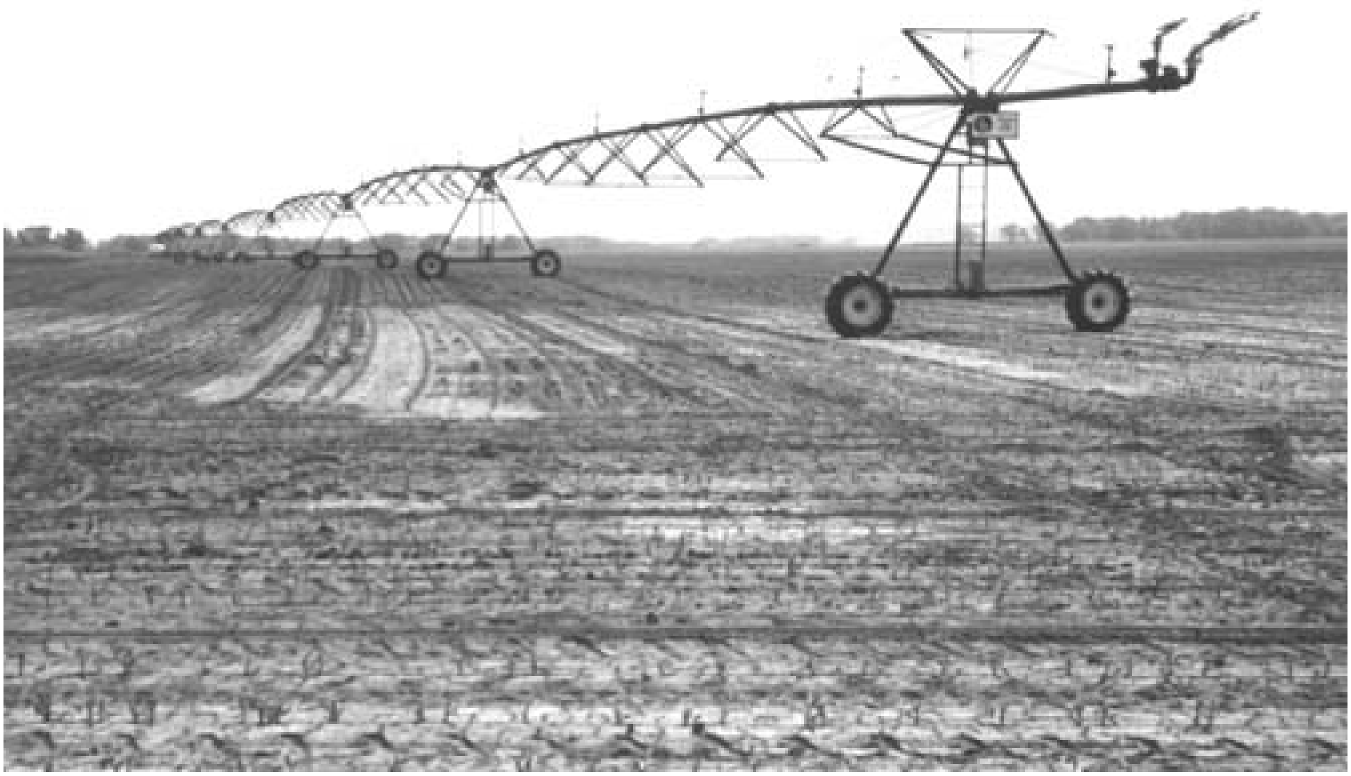

Figure 13.—Center-pivot irrigation is used to overcome the droughtiness in this area of Wea silt loam, 0 to 2 percent slopes.

Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown silt loam

Subsurface layer:
9 to 14 inches—very dark grayish brown silt loam

Subsoil:
14 to 24 inches—brown silty clay loam
24 to 32 inches—brown clay loam
32 to 40 inches—dark brown gravelly clay loam

Substratum:
40 to 80 inches—dark yellowish brown, calcareous very gravelly sandy loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and very rapid in the lower part
Parent material: Glacial outwash
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: High
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

- Soils that have more sand in the subsoil
- Soils that are deeper over gravel

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the

surface conserve soil moisture. Irrigation can also help to overcome the limited available water capacity.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Well suited

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength is a limitation. Strengthening or replacing the base material helps to overcome this limitation.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

435A—Streator silty clay loam, 0 to 2 percent slopes

Composition

Streator soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—black silty clay loam

Subsurface layer:
9 to 13 inches—black silty clay loam

Subsoil:
13 to 17 inches—dark gray silty clay loam
17 to 33 inches—gray silty clay
33 to 42 inches—gray silty clay loam
42 to 68 inches—grayish brown silty clay

Substratum:
68 to 80 inches—grayish brown silty clay

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Parent material: Loess over glacial till
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: High
Potential for frost action: High

Inclusions

• Soils that have less clay in the subsoil
• Soils that are deeper over glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Because of the ponding, wetness may delay planting or interfere with harvesting in many years. Surface ditches, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Because of the ponding, wetness may interfere with the harvesting of hay. Deferring grazing during wet periods helps to keep the plants in good condition and minimizes compaction and the formation of ruts.

Dwellings

Suitability: Poor
Management considerations:
• Adding several feet of suitable loamy material to the site, installing tile drains around the footings, and installing surface drains can lower the water table. Suitable tile outlets are needed. Grading and land shaping help to divert surface water from the site.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The restricted permeability and the ponding are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the shrink-swell potential are limitations. Strengthening or replacing the base material helps to overcome these limitations.
• Providing open ditches, which remove excess water, and raising the roadbed with proper fill material help to overcome the seasonal high water table and the ponding.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

484A—Harco silt loam, 0 to 2 percent slopes

Composition

Harco soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—black silt loam

Subsurface layer:
8 to 15 inches—black silt loam

Subsoil:
15 to 20 inches—dark grayish brown silty clay loam
20 to 31 inches—grayish brown silty clay loam
31 to 43 inches—grayish brown silt loam

Substratum:
43 to 80 inches—light olive brown, yellowish brown, and light brownish gray silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff: Slow
Available water capacity: Very high
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have carbonates at a lower depth
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• Installing tile drains around the footings can lower the water table.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The seasonal high water table is a limitation. Onsite

investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

536—Dumps, mine

Setting

Landform position: Nearly level to very steep mine spoil areas (fig. 14)
General description: Idle areas of this unit are bare or are covered with grasses, shrubs, or trees.

Soil Properties and Qualities

Permeability: Slow
Parent material: Deep mining spoil
Runoff: Slow to very rapid
Available water capacity: Low
Organic matter content: Low
Erosion hazard: Very severe

541B2—Graymont silty clay loam, 2 to 5 percent slopes, eroded

Composition

Graymont soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown silty clay loam

Subsoil:
9 to 14 inches—dark yellowish brown silty clay loam
14 to 29 inches—yellowish brown silty clay loam
29 to 43 inches—light olive brown, calcareous silty clay loam

Substratum:
43 to 80 inches—light olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and slow in the lower part
Parent material: Loess over glacial till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that have a thinner surface layer
• Soils that are deeper over glacial till
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate

Figure 14.—A large coal-mine spoil mound near Toluca is all that remains of the coal industry that once flourished in the survey area.

Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

541C2—Graymont silty clay loam, 5 to 10 percent slopes, eroded

Composition

Graymont soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 6 inches—mixed very dark grayish brown and dark yellowish brown silty clay loam

Subsoil:
6 to 13 inches—dark yellowish brown silty clay loam
13 to 24 inches—yellowish brown silty clay loam
24 to 32 inches—yellowish brown silt loam
32 to 53 inches—olive brown, calcareous silty clay loam

Substratum:
53 to 80 inches—olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that are shallow over glacial till
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table on sites for houses with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability and the seasonal high water table are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

549G—Marseilles silt loam, 35 to 60 percent slopes

Composition

Marseilles soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Woodland (fig. 15)

Typical Profile

Surface layer:
0 to 2 inches—dark grayish brown silt loam

Figure 15.—A wooded area of Marseilles silt loam, 35 to 60 percent slopes.

Subsoil:
2 to 5 inches—light olive brown silty clay loam
5 to 13 inches—olive silty clay loam
13 to 22 inches—olive and yellowish brown silty clay loam
22 to 38 inches—olive and yellowish brown silt loam

Bedrock:
38 to 80 inches—grayish brown and yellowish brown, soft shale

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and slow in the lower part
Parent material: Weathered shale
Runoff: Very rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Very severe
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that are deeper over shale

Use and Management

Cropland

Suitability: Because of the slope, this soil is not suited to crops.

Pasture and hay

Suitability: Because of the slope, this soil is not suited to pasture and hay.

Woodland

Suitability: Poor
Management considerations:
• Building logging roads and skid trails on or near the contour and diverting surface water help to control erosion. Seeding all bare areas to grass or a grass-

legume mixture after logging has been completed also reduces the hazard of erosion.
• In the steeper areas, the logs should be skidded uphill with a cable and winch.

Dwellings

Suitability: Because of the slope, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the slope, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Because of the slope, this soil is not suited to use as a site for roads and streets.

Interpretive Groups

Land capability classification: 7e
Farmland classification: None

567B—Elkhart silt loam, 2 to 5 percent slopes

Composition

Elkhart soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown silt loam

Subsurface layer:
9 to 13 inches—very dark grayish brown silt loam

Subsoil:
13 to 21 inches—dark brown silty clay loam
21 to 30 inches—dark yellowish brown silty clay loam
30 to 49 inches—yellowish brown, calcareous silt loam

Substratum:
49 to 80 inches—yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 2 to 4 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer
- Soils that have carbonates at a lower depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting (fig. 16), farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
• Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Figure 16.—No-till soybeans planted in corn stubble in an area of Elkhart silt loam, 2 to 5 percent slopes.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

567C2—Elkhart silty clay loam, 5 to 10 percent slopes, eroded

Composition

Elkhart soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown silty clay loam

Subsoil:
8 to 24 inches—dark yellowish brown silty clay loam
24 to 43 inches—yellowish brown silt loam

Substratum:
43 to 60 inches—yellowish brown silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained

Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thicker surface layer
- Soils that have carbonates at a lower depth

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
- Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
- Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.
- Installing tile drains around the footings can lower the water table on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

570A—Martinsville silt loam, 0 to 2 percent slopes

Composition

Martinsville soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Nearly level terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown silt loam

Subsurface layer:
8 to 12 inches—dark brown silt loam

Subsoil:
12 to 46 inches—dark yellowish brown clay loam
46 to 62 inches—yellowish brown loam

Substratum:
62 to 80 inches—yellowish brown, stratified sandy loam and loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet

Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

- Soils that have less sand in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- No major limitations affect the use of this soil for crops.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Moderate
Management considerations:
- The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
- Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

570C—Martinsville fine sandy loam, 5 to 10 percent slopes

Composition

Martinsville soil and similar inclusions: 75 to 80 percent
Contrasting inclusions: 20 to 25 percent

Setting

Landform position: Side slopes on terraces
Major use: Row crops

Typical Profile

Surface layer:
0 to 5 inches—mixed very dark grayish brown and very dark brown fine sandy loam

Subsoil:
5 to 9 inches—brown loam
9 to 16 inches—brown clay loam
16 to 23 inches—brown sandy clay loam
23 to 45 inches—brown sandy loam
45 to 56 inches—dark yellowish brown loam

Substratum:
56 to 60 inches—brown, calcareous sandy loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial outwash
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

- Soils that have less sand in the subsoil
- Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.

• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Moderate
Management considerations:
• The restricted permeability is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Moderate
Management considerations:
• Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 3e
Farmland classification: Farmland of statewide importance

614A—Chenoa silt loam, 0 to 2 percent slopes

Composition

Chenoa soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Nearly level summits on till plains
Major use: Row crops

Typical Profile

Surface layer:
0 to 10 inches—black silt loam

Subsurface layer:
10 to 13 inches—very dark gray silt loam

Subsoil:
13 to 22 inches—dark grayish brown silty clay loam
22 to 43 inches—grayish brown silty clay loam
43 to 55 inches—grayish brown, calcareous silty clay loam

Substratum:
55 to 80 inches—grayish brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and slow in the lower part
Parent material: Loess over glacial till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

• Soils that are deeper over glacial till
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table is a limitation. Wetness may delay planting or interfere with harvesting in many years. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Dwellings

Suitability: Poor
Management considerations:
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

• Installing tile drains around the footings can lower the water table.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• Enlarging the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.
• The seasonal high water table is a limitation. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland

618D2—Senachwine silt loam, 10 to 15 percent slopes, eroded

Composition

Senachwine soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Pasture or hay

Typical Profile

Surface layer:
0 to 5 inches—mixed dark brown and dark yellowish brown silt loam

Subsoil:
5 to 12 inches—dark yellowish brown silty clay loam
12 to 32 inches—brown clay loam
32 to 37 inches—brown, calcareous loam

Substratum:
37 to 80 inches—brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Low
Erosion hazard: Very severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

• Soils that have carbonates closer to the surface
• Soils that are deeper over till

Use and Management

Cropland

Suitability: Poor
Management considerations:
• Including forage crops in the rotation, applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, stripcropping, terracing, or a combination of these can help to keep soil losses within tolerable limits.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.

Woodland

Suitability: Well suited

Dwellings

Suitability: Moderate
Management considerations:
• Cutting, filling, and land shaping help to overcome the slope.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The slope and the restricted permeability are

limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• The low bearing strength is a limitation. Strengthening or replacing the base material helps to overcome this limitation.

Interpretive Groups

Land capability classification: 4e
Farmland classification: Farmland of statewide importance

618E—Senachwine loam, 15 to 25 percent slopes

Composition

Senachwine soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Side slopes on till plains
Major use: Pasture or hay (fig. 17)

Typical Profile

Surface layer:
0 to 4 inches—dark brown loam

Subsurface layer:
4 to 11 inches—brown loam

Subsoil:
11 to 28 inches—dark yellowish brown clay loam
28 to 44 inches—yellowish brown, calcareous loam

Substratum:
44 to 80 inches—yellowish brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess over glacial till
Runoff: Very rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Low
Erosion hazard: Very severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

• Soils that have carbonates closer to the surface
• Soils that are deeper over till

Use and Management

Cropland

Suitability: Unsuited

Pasture and hay

Suitability: Poor
Management considerations:
• Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.
• Special equipment and techniques are needed if pasture and hay species are planted or if chemicals and fertilizer are applied. The very steep areas are unsuitable for hay because of limitations affecting the use of harvesting equipment.

Woodland

Suitability: Moderate
• Building logging roads and skid trails on or near the contour and diverting surface water help to control erosion. Seeding all bare areas to grass or a grass-legume mixture after logging has been completed also reduces the hazard of erosion.

Dwellings

Suitability: Poor
Management considerations:
• Cutting, filling, and land shaping help to overcome the slope.
• Reinforcing the foundation and extending it below the subsoil help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poor
Management considerations:
• The slope and the restricted permeability are limitations. Onsite investigation is needed. The design of absorption fields should meet local and state guidelines.

Roads and streets

Suitability: Poor
Management considerations:
• Cutting, filling, and land shaping help to overcome the slope.

Figure 17.—Wooded pasture in an area of Senachwine loam, 15 to 25 percent slopes.

• Strengthening or replacing the base material helps to prevent the damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: 6e
Farmland classification: None

802B—Orthents, loamy, undulating

Composition

Orthents and similar inclusions: 75 to 80 percent
Contrasting inclusions: 20 to 25 percent

Typical Profile

Surface layer:
0 to 3 inches—dark brown loam

Substratum:
3 to 15 inches—dark yellowish brown loam
15 to 60 inches—light olive brown sandy loam

Soil Properties and Qualities

Permeability: Moderately slow
Available water capacity: Low
Depth to the seasonal high water table: More than 6 feet
Shrink-swell potential: Moderate

865—Pits, gravel

Setting

Landform: Uplands

Component Description

• This map unit consists of open excavations from which gravel has been removed.
• Soil properties are variable. Onsite investigation is needed to determine the properties in specific areas.

883F—Senachwine-Hennepin complex, 25 to 35 percent slopes

Composition

Senachwine and Hennepin soils and similar inclusions: 75 to 80 percent
Contrasting inclusions: 20 to 25 percent

Setting

Landform position: Side slopes on till plains
Major use: Woodland

Typical Profile

Senachwine

Surface layer:
0 to 6 inches—very dark grayish brown loam

Subsoil:
6 to 11 inches—brown clay loam
11 to 21 inches—dark yellowish brown clay loam
21 to 39 inches—yellowish brown clay loam

Substratum:
39 to 60 inches—yellowish brown, calcareous clay loam

Hennepin

Surface layer:
0 to 6 inches—very dark grayish brown loam

Subsoil:
6 to 11 inches—brown clay loam
11 to 20 inches—dark yellowish brown, calcareous clay loam
20 to 42 inches—yellowish brown, calcareous clay loam

Substratum:
42 to 60 inches—yellowish brown, calcareous clay loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Glacial till
Runoff: Very rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Very severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

- Soils that have less sand in the subsoil

Use and Management

Cropland

Suitability: Because of the slope, these soils are not suited to crops.

Pasture and hay

Suitability: Poor
Management considerations:
- Overgrazing reduces forage yields and causes surface compaction, which results in excessive runoff and increases the hazard of erosion. Deferred grazing, rotation grazing, and applications of fertilizer help to keep the plants in good condition and help to control erosion.
- Special equipment and techniques are needed if pasture and hay species are planted or if chemicals and fertilizer are applied. The very steep areas are unsuitable for hay because of limitations affecting the use of harvesting equipment.

Woodland

Suitability: Moderate
Management considerations:
- Building logging roads and skid trails on or near the contour and diverting surface water help to control erosion. Seeding all bare areas to grass or a grass-legume mixture after logging has been completed also reduces the hazard of erosion.
- In the steeper areas, the logs should be skidded uphill with a cable and winch.

Dwellings

Suitability: Because of the slope, these soils are not suited to use as sites for dwellings.

Septic tank absorption fields

Suitability: Because of the slope, these soils are not suited to use as sites for septic tank absorption fields.

Roads and streets

Suitability: Because of the slope, these soils are not suited to use as sites for roads and streets.

Interpretive Groups

Land capability classification: Senachwine—6e; Hennepin—7e
Farmland classification: None

3028A—Jules silt loam, 0 to 2 percent slopes, frequently flooded

Composition

Jules soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Flood plains
Frequency of flooding: Frequent (March through June)
Flooding duration: Brief
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown, calcareous silt loam

Substratum:
8 to 46 inches—stratified dark grayish brown, very dark grayish brown, and yellowish brown, calcareous silt loam with strata of loam, very fine sandy loam, and loamy fine sand
46 to 60 inches—stratified brown, dark grayish brown, very dark grayish brown, and yellowish brown, calcareous silt loam, loamy fine sand, and loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Silty alluvium
Runoff: Slow
Available water capacity: Very high
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Low
Potential for frost action: High

Inclusions

- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees can minimize the crop damage caused by flooding.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Well suited

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
- Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
- Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where protected from flooding or not frequently flooded during the growing season)

3360L—Slacwater silty clay loam, 0 to 2 percent slopes, frequently flooded, long duration

Composition

Slacwater soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Flood plains
Frequency of flooding: Frequent (October through June)
Flooding duration: Very long
Major use: Woodland

Typical Profile

Surface layer:
0 to 6 inches—very dark gray, calcareous silty clay loam

Substratum:
6 to 20 inches—dark grayish brown and very dark gray, calcareous gray silt loam
20 to 38 inches—dark grayish brown and very dark gray, calcareous silty clay loam
38 to 60 inches—gray, calcareous silt loam

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Silty alluvium
Runoff: Very slow or ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: Moderately low
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Low
Potential for frost action: High

Inclusions

- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Poor
Management considerations:
- The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees can minimize crop damage caused by flooding.
- Because of the ponding, wetness may delay planting or interfere with harvesting in many years. Surface ditches, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
- Because of the ponding, wetness may interfere with the harvesting of hay. Deferring grazing during wet periods helps to keep the plants in good condition and minimizes compaction and the formation of ruts.

Woodland

Suitability: Moderate
Management considerations:
- The wetness limits the use of equipment. Using machinery only when the soil is firm enough to provide adequate support helps to prevent the formation of ruts and minimizes compaction.
- The wetness increases the seedling mortality rate. Providing adequate site preparation, using seedlings that are adapted to the wetter soil conditions, and creating drainageways that remove surface water reduce the seedling mortality rate and help to eliminate competition from undesirable species.

Dwellings

Suitability: Because of the flooding and the ponding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding and the ponding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
- Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
- Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 5w
Farmland classification: Farmland of statewide importance

3480L—Moundprairie silty clay loam, 0 to 2 percent slopes, frequently flooded, long duration

Composition

Moundprairie soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Flood plains
Frequency of flooding: Frequent (October through June)
Flooding duration: Very long
Major use: Woodland

Typical Profile

Surface layer:
0 to 10 inches—very dark gray and very dark

grayish brown, calcareous silty clay loam with lenses of loam and silt loam

Substratum:
10 to 48 inches—very dark gray and olive brown, calcareous silty clay loam

Buried surface layer:
48 to 80 inches—black, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Silty alluvium
Runoff: Very slow
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: Moderate
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Low
Potential for frost action: High

Inclusions

- Soils that contain more sand

Use and Management

Cropland

Suitability: Because of the flooding and the ponding, this soil is not suited to crops.

Pasture and hay

Suitability: Because of the flooding and the ponding, this soil is not suited to pasture and hay.

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding and the ponding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding and the ponding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Because of the flooding and the ponding, this soil is not suited to use as a site for roads and streets.

Interpretive Groups

Land capability classification: 5w
Farmland classification: None

7081A—Littleton silt loam, 0 to 2 percent slopes, rarely flooded

Composition

Littleton soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Flood plains
Frequency of flooding: Rare (March through May)
Flooding duration: Brief
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—black silt loam

Subsurface layer:
7 to 18 inches—black silt loam
18 to 26 inches—very dark gray silty clay loam

Subsoil:
26 to 37 inches—brown silty clay loam
37 to 60 inches—grayish brown silty clay loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Silty alluvium
Runoff: Slow
Available water capacity: Very high
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderate
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Low
Potential for frost action: High

Inclusions

- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees help to prevent crop damage caused by flooding.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Moderate
Management considerations:
• Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 1
Farmland classification: Prime farmland

7304B—Landes loam, 2 to 5 percent slopes, rarely flooded

Composition

Landes soil and similar inclusions: 75 to 80 percent
Contrasting inclusions: 20 to 25 percent

Setting

Landform position: Flood plains
Frequency of flooding: Rare (March through May)
Flooding duration: Brief
Major use: Row crops

Typical Profile

Surface layer:
0 to 8 inches—very dark brown loam

Subsurface layer:
8 to 13 inches—dark brown loam

Subsoil:
13 to 24 inches—dark brown, calcareous loam
24 to 38 inches—dark brown, calcareous fine sandy loam

Substratum:
38 to 60 inches—dark brown, calcareous, stratified sandy loam and loamy sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Loamy and sandy alluvium
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

• Soils that have more clay in the subsoil
• Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Poor
Management considerations:
• The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees help to prevent crop damage caused by flooding.
• Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface conserve soil moisture. Irrigation can also help to overcome the limited available water capacity.
• Tilling when the soil is wet causes surface compaction and cloddiness, which may result in increased runoff and erosion.
• Adding organic material to the soil increases the available water capacity and improves fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation help to maintain plant quality.

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding, this soil is not

suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
• Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
• Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 2e
Farmland classification: Prime farmland

8073A—Ross silt loam, 0 to 2 percent slopes, occasionally flooded

Composition

Ross soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Flood plains
Frequency of flooding: Occasional (October through June)
Flooding duration: Brief
Major use: Row crops

Typical Profile

Surface layer:
0 to 9 inches—very dark gray silt loam

Subsurface layer:
9 to 36 inches—very dark gray silt loam

Subsoil:
36 to 48 inches—dark brown loam
48 to 54 inches—brown loam
54 to 80 inches—dark grayish brown, calcareous, stratified silt loam to gravelly loamy sand

Substratum:
65 to 70 inches—calcareous gravelly loamy sand

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy alluvium
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 4 to 6 feet
Organic matter content: High
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Inclusions

• Soils that have carbonates closer to the surface
• Soils that have less sand in the subsoil

Use and Management

Cropland

Suitability: Moderate
Management considerations:
• The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees help to prevent crop damage caused by flooding.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
• Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
• The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland

8074A—Radford silt loam, 0 to 2 percent slopes, occasionally flooded

Composition

Radford soil and similar inclusions: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform position: Flood plains
Frequency of flooding: Occasional (October through June)
Flooding duration: Brief
Major use: Row crops

Typical Profile

Surface layer:
0 to 7 inches—very dark gray silt loam

Subsurface layer:
7 to 21 inches—very dark gray silt loam

Substratum:
21 to 35 inches—very dark gray, dark grayish brown, and dark brown silt loam

Buried surface layer:
35 to 50 inches—black silty clay loam

Buried subsoil:
50 to 66 inches—light olive gray silty clay loam

Buried substratum:
66 to 80 inches—light olive gray silty clay loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Silty alluvium over a buried soil
Runoff: Slow
Available water capacity: Very high
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Susceptible to streambank erosion (fig. 18)
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees help to prevent crop damage caused by flooding.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Well suited

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
- Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
- The low bearing strength and the potential for frost action are limitations. Strengthening or replacing the base material helps to overcome these limitations.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland

8107A—Sawmill silty clay loam, 0 to 2 percent slopes, occasionally flooded

Composition

Sawmill soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Flood plains
Frequency of flooding: Occasional (October through June)
Flooding duration: Brief
Major use: Row crops

Figure 18.—Streambank erosion has deepened and widened a creek in this area of Radford silt loam, 0 to 2 percent slopes, occasionally flooded.

Typical Profile

Surface layer:
0 to 7 inches—black silty clay loam

Subsurface layer:
7 to 28 inches—black silty clay loam

Subsoil:
28 to 33 inches—very dark gray silty clay loam
33 to 52 inches—grayish brown and strong brown silty clay loam
52 to 60 inches—grayish brown silty clay loam

Substratum:
60 to 80 inches—grayish brown silty clay loam

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Silty alluvium
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: At the surface to 1 foot below the surface
Organic matter content: High

Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Moderate
Potential for frost action: High

Inclusions

- Soils that have more sand in the subsoil
- Soils that have a thicker surface layer

Use and Management

Cropland

Suitability: Moderate
Management considerations:
- Wetness may delay planting or interfere with harvesting in many years. Surface ditches, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed.
- Adequately constructed and maintained levees help to prevent crop damage caused by flooding.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil can maintain or improve tilth and fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
- Wetness may interfere with the harvesting of hay. Deferring grazing during wet periods helps to keep the plants in good condition and minimizes compaction and the formation of ruts.

Woodland

Suitability: Moderate (fig. 19)
Management considerations:
- Wetness limits the use of equipment. Using machinery only when the soil is firm enough to provide adequate support helps to prevent the formation of ruts and minimizes compaction.
- The wetness also increases the seedling mortality rate. Providing adequate site preparation, using seedlings that are adapted to the wetter soil conditions, and creating drainageways that can remove surface water reduce the seedling mortality rate and help to eliminate competition from undesirable species.

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding and the restricted permeability, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
- Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
- The low bearing strength is a limitation. Strengthening or replacing the base material helps to overcome this limitation.
- Providing open ditches, which remove excess water, and raising the roadbed with proper fill material help to overcome the seasonal high water table.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland (where properly drained)

8304A—Landes fine sandy loam, 0 to 2 percent slopes, occasionally flooded

Composition

Landes soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Flood plains
Frequency of flooding: Occasional (October through June)
Flooding duration: Brief
Major uses: Row crops or woodland

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown fine sandy loam

Subsurface layer:
9 to 20 inches—very dark grayish brown sandy loam

Subsoil:
20 to 26 inches—dark brown sandy loam
26 to 43 inches—dark yellowish brown loamy sand

Substratum:
43 to 80 inches—yellowish brown, calcareous loam to sand

Figure 19.—A wooded area of Sawmill silty clay loam, 0 to 2 percent slopes, occasionally flooded, is dissected by Crow Creek.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid in the upper part and rapid in the lower part
Parent material: Loamy and sandy alluvium
Runoff: Very slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

- Soils that have less sand in the subsoil
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Poor
Management considerations:
- The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees help to prevent crop damage caused by flooding.
- Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface conserve soil moisture. Irrigation can also help to overcome the limited available water capacity.
- Tilling when the soil is wet causes surface compaction and cloddiness.
- Adding organic material to the soil increases the available water capacity and improves fertility.

Pasture and hay

Suitability: Moderate
Management considerations:
• Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation help to maintain plant quality.

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
• Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.
• Strengthening or replacing the base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: 2s
Farmland classification: Prime farmland

8368A—Raveenwash silt loam, 0 to 2 percent slopes, occasionally flooded

Composition

Raveenwash soil and similar inclusions: 80 to 85 percent
Contrasting inclusions: 15 to 20 percent

Setting

Landform position: Flood plains
Frequency of flooding: Occasional (October through June)
Flooding duration: Long
Major use: Row crops

Typical Profile

Surface layer:
0 to 5 inches—mixed brown and very dark grayish brown, calcareous silt loam

Substratum:
5 to 9 inches—brown, calcareous sand
9 to 33 inches—very dark grayish brown, brown, and dark grayish brown, calcareous, stratified silt loam to loamy sand
33 to 53 inches—very dark grayish brown and dark grayish brown, calcareous, stratified silt loam to loamy sand
53 to 80 inches—brown and very dark grayish brown, calcareous, stratified gravelly sand to loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately rapid
Parent material: Loamy and sandy alluvium
Runoff: Slow
Available water capacity: Moderately low
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderately low
Erosion hazard: Susceptible to streambank erosion
Shrink-swell potential: Low
Potential for frost action: Moderate

Inclusions

• Soils that have more clay in the subsoil
• Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Poor
Management considerations:
• The flooding may delay planting or interfere with harvesting. Adequately constructed and maintained levees help to prevent crop damage caused by flooding.
• Establishing field windbreaks and applying a system of conservation tillage that leaves crop residue on the surface conserve soil moisture. Irrigation can also help to overcome the limited available water capacity.
• Tilling when the soil is wet causes surface compaction and cloddiness.
• Adding organic material to the soil helps to minimize crusting and improves tilth and fertility.

Pasture and hay

Suitability: Moderate

Management considerations:
• Droughtiness is a limitation. Planting drought-resistant grasses and legumes helps to establish a plant cover. Deferred grazing, rotation grazing, applications of fertilizer, and irrigation can maintain plant quality.

Woodland

Suitability: Well suited

Dwellings

Suitability: Because of the flooding, this soil is not suited to use as a site for dwellings.

Septic tank absorption fields

Suitability: Because of the flooding, this soil is not suited to use as a site for septic tank absorption fields.

Roads and streets

Suitability: Poor
Management considerations:
• Raising the roadbed by adding fill material to a height above the maximum flood stage helps to overcome the flooding.

Interpretive Groups

Land capability classification: 2w
Farmland classification: Prime farmland

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

The soils in Marshall County have good potential for the production of crops, particularly corn, soybeans, wheat, and hay.

The main management needs in the county are measures that control erosion, lower the seasonal high water table, and improve fertility and tilth. Soil erosion is a potential problem on more than 49 percent of the county. It is a hazard if the slope is more than 2 percent and the surface is not protected. Highly erodible land, or land that has slopes of more than 5 percent, makes up 51,294 acres, or about 20 percent of the county.

Erosion is damaging for three main reasons. First, the upper 6 to 9 inches of the soil contains the major portion of the organic matter, which greatly assists in the capability of the soil to supply nutrients and water. If this part of the soil is eroded away, the less productive subsoil is incorporated into the plow layer. Second, severe erosion reduces the rate of water infiltration and increases the runoff rate. Third, erosion allows sediment to enter waterways, ponds, streams, lakes, ditches, and rivers. Removing this sediment is expensive. Management that controls erosion minimizes pollution caused by sediment and improves the quality of water for municipal and recreational uses and for fish and wildlife.

Several conservation practices can be used to control erosion and runoff and increase the rate of water infiltration. Examples are terraces, contour farming, and a system of conservation tillage that leaves crop residue on the surface after planting.

Terraces, contour farming, and conservation tillage help to control erosion by reducing the rate of runoff. Terraces are effective on slopes that are uniform and are not broken by drainageways. Contour farming, which involves tilling and planting on the contour, is

most effective in areas that have slopes of 7 percent or less. This practice is commonly used in combination with terraces. Land smoothing helps to align the terraces and facilitates cultivation on the contour. A conservation tillage system is one in which crop residue is left on the surface throughout the planting season. The crop residue protects the soil from erosion, helps to maintain good soil structure, minimizes surface compaction, and improves tilth. A no-till or minimum tillage system helps to control erosion, reduces the runoff rate, and increases the rate of water infiltration. Conservation tillage is suitable on most of the soils in the county but is less successful in severely eroded areas and in areas where wetness is a problem.

Sandy soils are susceptible to wind erosion. Maintaining a cover of plants or mulch and keeping the surface rough by using proper tillage methods help to control wind erosion. Windbreaks also are effective in controlling wind erosion.

Further information about erosion-control measures is available at the local office of the Natural Resources Conservation Service.

Some type of artificial drainage system has been installed in most areas of the poorly drained and somewhat poorly drained soils in the county. The seasonal high water table has been effectively lowered in most areas where it was a limitation. Measures that maintain the drainage system are needed.

Maintaining soil fertility and tilth is important for crop production and pasture. Additions of lime, nitrogen, phosphorus, and potassium are needed on most soils to maintain fertility. Applications of fertilizer should be based on the results of soil tests. Soil tilth influences the germination of seeds, the rate of runoff, and the rate of water infiltration. Poor tilth is a problem in areas of soils that have a light-colored surface layer and a low content of organic matter. Including grasses or legumes in the cropping sequence and adding manure can improve tilth.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the county also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, ***e, w, s,*** or ***c,*** to the class numeral, for example, 2e. The letter ***e*** shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; ***w*** shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); ***s*** shows that the soil is limited mainly because it is shallow, droughty, or stony; and ***c,*** used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by ***w, s,*** or ***c*** because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 190,000 acres in the survey area, or 75 percent of the total acreage, meets the soil requirements for prime farmland. Areas of this land are scattered throughout the county. The crops grown on this land, mainly corn and soybeans, account for most of the county's total agricultural income each year.

The map units in the survey area that are considered prime farmland are listed in table 6. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. In Marshall County, most of the naturally wet soils have been adequately drained. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

In some areas land that does not meet the criteria for prime farmland is considered to be ***farmland of statewide importance*** for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate state agencies. Generally, this land includes areas of soils that are nearly prime farmland and that economically produce high yields of crops when treated and

managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable.

The soils in the survey area that are considered farmland of statewide importance are identified as such in the detailed soil map unit descriptions.

Woodland Management and Productivity

Before the European settlement of Marshall County, about 77,000 acres, or 30 percent of the total land area, was woodland. Most of the trees have been cleared from the soils that are suitable for cultivated crops. As a result, much of the remaining woodland is in areas that are too steep for cultivation.

The largest area of woodland is in the Hennepin-Birkbeck-Senachwine association (fig. 20), which is described under the heading “General Soil Map Units.” The most common trees in the uplands are white oak, red oak, hickory, ash, maple, boxelder, and walnut. The most common trees on the flood plains are cottonwood, sycamore, willow, white oak, and hickory.

Many of the existing woodlands can be improved by thinning out mature trees and trees of low value. Measures that protect the woodland from fire and grazing are needed. Logging trails and access roads are commonly on steep slopes. Shaping and seeding these trails and roads and applying fertilizer immediately after harvest help to control erosion. Interplanting is needed for maximum woodland production. Control or removal of competing vegetation is needed if seedlings are planted. A grass cover is needed if seedlings are planted on bare, sloping land.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the ***ordination symbol***, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce in a pure stand under natural conditions. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter ***R*** indicates steep slopes; ***X***, stoniness or rockiness; ***W***, excess water in or on the soil; ***T***, toxic substances in the soil; ***D***, restricted rooting depth; ***C***, clay in the upper part of the soil; ***S***, sandy texture; ***F***, a high content of rock fragments in the soil; ***L***, low strength; and ***N***, snowpack. The letter ***A*** indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, L, and N.

In table 7, ***slight, moderate,*** and ***severe*** indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed also are subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of ***slight*** indicates that no particular prevention measures are needed under ordinary conditions. A rating of ***moderate*** indicates that erosion-control measures are needed in certain silvicultural activities. A rating of ***severe*** indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of ***slight*** indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of ***moderate*** indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of ***severe*** indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of ***slight*** indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25

Figure 20.—Local sawmills harvest and process hardwoods from the wooded bluffs in the Hennepin-Birkbeck-Senachwine association.

percent. A rating of ***moderate*** indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of ***severe*** indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of ***slight*** indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of ***moderate*** indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of ***severe*** indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of ***slight*** indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of ***moderate*** indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of ***severe*** indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The ***potential productivity*** of merchantable or ***common trees*** on a soil is expressed as a ***site index*** and as a ***volume*** number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of

years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The ***volume of wood fiber***, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Suggested trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. ***Slight*** means that soil properties are generally favorable and that limitations are minor and easily overcome. ***Moderate*** means that limitations can be overcome or alleviated by planning, design, or special maintenance. ***Severe*** means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry.

If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Kent Boyles, private lands wildlife biologist, Illinois Department of Conservation, helped prepare this section.

Wildlife habitat in Marshall County is diverse, ranging from the wooded uplands of Crow Creek and the Illinois River corridors to the vast row-cropped openland of the old prairie. This mixture of habitat types results in a diversity of wildlife in the county during part or all of the year. Wild turkey, white-tailed deer, pheasant, bobwhite quail, Canada geese, bald eagle, and various ducks are only a few of the numerous wildlife species inhabiting different parts of the county.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of ***good*** indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of ***fair*** indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of ***poor*** indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of ***very poor*** indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and soybeans.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, sycamore, maple, elm, walnut, ash, and hickory. Examples of fruit-producing shrubs that are suitable for planting on soils rated ***good*** are gray dogwood, silky dogwood, American plum, hazelnut, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth

of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, cattail, buttonbush, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are cattail marshes, greentree reservoirs (flooded timber areas), and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, American kestrel, field sparrow, and cottontail rabbit.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, thrushes, woodpeckers, squirrels, fox, coyote, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas (fig. 21). Some of the wildlife attracted to such areas are ducks, geese, herons, frogs, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading "Soil Properties."

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Figure 21.—Wetland plants and shallow water areas on the flood plains along the Illinois River provide excellent habitat for waterfowl.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered ***slight*** if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; ***moderate*** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and ***severe*** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, or other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and ***small commercial buildings*** are

structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered ***slight*** if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; ***moderate*** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and ***severe*** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of ***good*** indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; ***fair*** indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and ***poor*** indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope,

permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated ***good, fair,*** or ***poor*** as a source of roadfill and topsoil. They are rated as a ***probable*** or ***improbable*** source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavation and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated ***good*** contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated ***fair*** are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones or have a water table at a depth of 1 to 3 feet. Soils rated ***poor*** have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25

percent; are wet; or have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and ***gravel*** are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated ***good*** have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated ***fair*** are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated ***poor*** are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered ***slight*** if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; ***moderate*** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and ***severe*** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to

seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated

sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and ***plasticity index*** (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Tables 16 and 17 show estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading “Soil Series and Their Morphology.”

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the tables, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

In table 16, ***moist bulk density*** is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^{1}/_{3}$-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In the table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are ***low***, a change

of less than 3 percent; ***moderate***, 3 to 6 percent; ***high***, 6 to 9 percent, and ***very high***, greater than 9 percent.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

In table 17, ***cation-exchange capacity*** is the total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. Soils having a high cation-exchange capacity can retain cations. The ability to retain cations helps to prevent the pollution of ground water.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Soil and Water Features

Tables 18 and 19 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

In table 18, ***hydrologic soil groups*** are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. ***None*** means that flooding is not probable; ***rare*** that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); ***occasional*** that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and ***frequent*** that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as ***very brief*** if less than 2 days, ***brief*** if 2 to 7 days, ***long*** if 7 days to 1 month, and ***very long*** if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in table 18 are depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An ***apparent*** water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A ***perched*** water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. “More than 6.0” indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. ***Ponding duration*** classes are the same as those for flooding. ***Maximum ponding depth*** refers to the depth of the water above the surface of the soil.

In table 19, ***depth to bedrock*** is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on

thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as ***low, moderate,*** or ***high,*** is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as ***low, moderate,*** or ***high***. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in ***sol***. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (***Aqu***, meaning water, plus ***oll***, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Endoaquolls (***Endo***, meaning within, plus ***aquoll***, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective ***Typic*** identifies the subgroup that typifies the great group. An example is Typic Endoaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Endoaquolls.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Birkbeck Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part

Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 2 to 10 percent

Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Hapludalfs

Typical Pedon

Birkbeck silty clay loam, 5 to 10 percent slopes, eroded, 1,240 feet north and 165 feet west of the southeast corner of sec. 18, T. 30 N., R. 1 W.

Ap—0 to 9 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; many very fine and fine roots; moderately acid; abrupt smooth boundary.

Bt1—9 to 19 inches; yellowish brown (10YR 5/4) silty clay loam; moderate very fine and fine prismatic structure parting to strong fine subangular blocky; friable; many very fine and fine roots; many continuous prominent dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; strongly acid; gradual wavy boundary.

Bt2—19 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; friable; common very fine and fine roots; many continuous prominent dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; strongly acid; gradual wavy boundary.

Bt3—28 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure; friable; few very fine roots; common discontinuous prominent dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; few fine prominent light brownish gray (2.5Y 6/2) rounded iron depletions with diffuse boundaries throughout the matrix; slightly acid; clear wavy boundary.

Bt4—44 to 54 inches; yellowish brown (10YR 5/6) silt loam; moderate medium and coarse prismatic structure; friable; few very fine roots; few discontinuous distinct dark yellowish brown (10YR 4/4) clay films at top of horizon; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; common fine prominent light gray (2.5Y 7/2) rounded iron depletions with diffuse boundaries throughout the matrix; strongly effervescent; slightly alkaline; clear wavy boundary.

2BCk—54 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; weak coarse prismatic structure; firm; few very fine roots; common fine prominent light yellowish brown (2.5Y 6/3) irregular soft masses of carbonate with clear boundaries throughout the matrix; 5 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C—60 to 70 inches; light olive brown (2.5Y 5/4) silty clay loam; massive; firm; 4 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to more than 60 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—silt loam or silty clay loam

2BCk horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—loam, clay loam, silt loam, or silty clay loam

2C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—loam, clay loam, silt loam, or silty clay loam

Catlin Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 2 to 10 percent

Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Argiudolls

Taxadjunct features: The Catlin soils in map units 171B2 and 171C2 do not have a mollic epipedon, which is definitive for the series. These soils are classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Catlin silt loam, 2 to 5 percent slopes, eroded, 354 feet north and 585 feet east of the southwest corner of sec. 4, T. 13 N., R. 8 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; many very fine roots; moderately acid; abrupt smooth boundary.

BA—9 to 15 inches; brown (10YR 5/3) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine roots; many continuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—15 to 20 inches; brown (10YR 5/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Bt2—20 to 31 inches; brown (10YR 5/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many continuous distinct faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; common fine distinct grayish brown (2.5Y 5/2) iron depletions lining pores; slightly acid; clear smooth boundary.

Bt3—31 to 42 inches; brown (10YR 5/3) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; many fine and medium distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; many fine distinct grayish brown (2.5Y 5/2) iron depletions throughout the matrix and lining pores; slightly acid; gradual smooth boundary.

Bt4—42 to 49 inches; brown (10YR 5/3) silty clay loam; weak coarse subangular blocky structure; friable; few very fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; common fine distinct grayish brown (2.5Y 5/2) iron depletions throughout the matrix and lining pores; neutral; clear smooth boundary.

2Bt5—49 to 52 inches; brown (7.5YR 5/4) clay loam; weak coarse subangular blocky structure; friable; few very fine roots; common fine brown (10YR 4/3) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; common till pebbles; slightly alkaline; clear smooth boundary.

2C—52 to 80 inches; brown (7.5YR 5/4) loam; massive; friable; common till pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to 65 inches
Thickness of the mollic epipedon: 4 to 18 inches
Thickness of the loess: 40 to 60 inches

Ap or A horizon:
Hue—10YR
Value—2 to 4
Chroma—1 to 3
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—loam, clay loam, silt loam, silty clay loam, or sandy loam

2C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 or 5
Chroma—3 to 6

Texture—loam, clay loam, silt loam, or silty clay loam

Chenoa Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and slow in the lower part
Landform position: Nearly level summits on till plains
Parent material: Loess over glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Fine, illitic, mesic Aquic Argiudolls

Typical Pedon

Chenoa silt loam, 0 to 2 percent slopes, 123 feet south and 480 feet west of the northeast corner of sec. 13, T. 30 N., R. 1 W.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; few very fine and fine roots; neutral; clear smooth boundary.

A—10 to 13 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine granular structure; friable; few very fine and fine roots; neutral; clear smooth boundary.

Btg1—13 to 22 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate very fine subangular blocky structure; friable; common discontinuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; many discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) and brown (10YR 5/3) iron masses with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Btg2—22 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate fine subangular blocky structure; friable; few very fine and fine roots; few discontinuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; many discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; common fine distinct grayish brown (10YR 5/2) iron depletions throughout the matrix; neutral; gradual wavy boundary.

2Btg3—36 to 43 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; common discontinuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; many fine and medium prominent yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; common fine faint light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; 2 percent rock fragments; slightly alkaline; gradual wavy boundary.

2BCkg—43 to 55 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure; firm; few very fine roots; many fine and medium prominent yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and few fine irregular carbonate nodules throughout the matrix; many fine and medium distinct light gray (5Y 6/1) iron depletions throughout the matrix; 2 percent rock fragments; slightly effervescent; slightly alkaline; gradual wavy boundary.

2Cg—55 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; firm; common fine prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; common fine distinct light gray (5Y 6/1) iron depletions throughout the matrix; 2 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 25 to 45 inches
Thickness of the mollic epipedon: 10 to 20 inches
Thickness of the loess: 25 to 40 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 6
Texture—silty clay loam or silty clay

2Btg and 2BCkg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—clay loam or silty clay loam

2C horizon:
Hue—10YR, 2.5Y, or 5Y

Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam

Clarksdale Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform position: Nearly level summits on till plains
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic classification: Fine, smectitic, mesic Udollic Epiaqualfs

Typical Pedon

Clarksdale silt loam, 0 to 2 percent slopes, 1,040 feet north and 1,900 feet east of the southwest corner of sec. 32, T. 12 N., R. 9 E.

Ap—0 to 8 inches; 95 percent very dark grayish brown (10YR 3/2) and 5 percent grayish brown (10YR 5/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; common very fine and fine roots; few fine rounded black (10YR 2/1) iron-manganese nodules with clear boundaries throughout the matrix; neutral; abrupt smooth boundary.

E—8 to 11 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; weak medium platy structure parting to moderate very fine granular; friable; common very fine and fine roots; common discontinuous distinct light gray (10YR 7/2 dry) silt coatings and few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine and medium rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; moderately acid; clear smooth boundary.

Bt1—11 to 16 inches; brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine and fine roots; few discontinuous distinct light gray (10YR 7/2 dry) silt coatings and few discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; few fine and medium rounded iron-manganese nodules with diffuse boundaries throughout the matrix; many fine distinct grayish brown (10YR 5/2) iron depletions throughout the matrix; moderately acid; clear smooth boundary.

Bt2—16 to 24 inches; grayish brown (2.5Y 5/2) silty clay loam; strong fine subangular blocky structure; firm; common very fine and fine roots; many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; many fine prominent yellowish brown (10YR 5/8) rounded iron masses with diffuse boundaries and few fine and medium rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; many fine faint light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; slightly acid; clear smooth boundary.

Bt3—24 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; firm; few very fine and fine roots; many discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine prominent yellowish brown (10YR 5/8) rounded iron masses with diffuse boundaries and common fine and medium rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; many fine faint light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; slightly acid; clear smooth boundary.

Bt4—32 to 41 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to moderate medium angular blocky; firm; few very fine and fine roots; few discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine and medium prominent yellowish brown (10YR 5/8) rounded iron masses with diffuse boundaries and common fine and medium rounded iron-manganese nodules with diffuse boundaries throughout the matrix; many fine faint light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; neutral; clear smooth boundary.

BCk—41 to 52 inches; brown (10YR 5/3) silt loam; weak medium prismatic structure; friable; few very fine roots; many fine and medium prominent yellowish brown (10YR 5/8) rounded iron masses with diffuse boundaries, few fine and medium rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries, and many medium and coarse irregular carbonate nodules throughout the matrix; many fine and medium faint light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; slightly effervescent; moderately alkaline; gradual smooth boundary.

C—52 to 80 inches; brown (10YR 5/3), light gray (5Y 6/1), and yellowish brown (10YR 5/8) silt loam; massive; friable; slightly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to 55 inches
Thickness of the dark surface layer: 6 to 10 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silt loam or silty clay loam

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 8
Texture—silt loam

Dakota Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Landform position: Nearly level areas on high terraces
Parent material: Glacial outwash
Slope range: 0 to 5 percent

Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls

Typical Pedon

Dakota loam, 0 to 2 percent slopes, 48 feet south and 1,440 feet east of the northwest corner of sec. 19, T. 13 N., R. 10 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; friable; many very fine and fine roots; 1 percent rock fragments; slightly acid; abrupt smooth boundary.

A—10 to 14 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very fine and fine roots; 1 percent rock fragments; slightly acid; clear smooth boundary.

Bt1—14 to 21 inches; brown (10YR 4/3) loam; moderate fine subangular blocky structure; friable; many very fine and fine roots; common discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; 1 percent rock fragments; moderately acid; clear smooth boundary.

Bt2—21 to 29 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; 1 percent rock fragments; moderately acid; clear smooth boundary.

2Bt3—29 to 33 inches; brown (7.5YR 4/4) coarse sandy loam; moderate coarse subangular blocky structure; friable; common very fine roots; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; 2 percent rock fragments; moderately acid; clear wavy boundary.

2BC—33 to 37 inches; brown (7.5YR 4/4) loamy coarse sand; weak coarse subangular blocky structure; very friable; few very fine roots; 2 percent rock fragments; slightly acid; gradual wavy boundary.

2C—37 to 80 inches; brown (7.5YR 4/4) coarse sand; single grain; loose; few very fine roots; 2 percent rock fragments; slightly acid.

Range in Characteristics

Depth to sandy material: 20 to 40 inches (average of about 37 inches)
Thickness of the mollic epipedon: 10 to 16 inches (average of about 12 inches)

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—silt loam, sandy loam, or loam

Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 to 6
Texture—silt loam, sandy loam, loam, or clay loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—sandy loam or loamy sand

2C horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—loamy sand, sand, or coarse sand

Dodge Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 5 to 15 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Dodge silt loam, 10 to 15 percent slopes, eroded, 1,712 feet east and 117 feet south of the northwest corner of sec. 31, T. 12 N., R. 3 W.

Ap—0 to 6 inches; 80 percent brown (10YR 4/3) and 20 percent yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many very fine and fine roots; slightly acid; clear smooth boundary.

BE—6 to 9 inches; brown (10YR 4/3) silty clay loam; weak medium platy structure parting to moderate very fine subangular blocky; friable; many very fine and fine roots; common discontinuous distinct light gray (10YR 7/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—9 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and very fine subangular blocky structure; friable; many very fine and fine roots; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—14 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; strong medium subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—21 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) and few fine distinct light yellowish brown (2.5Y 4/6) rounded iron masses with diffuse boundaries throughout the matrix; neutral; gradual wavy boundary.

2Bt4—32 to 38 inches; brown (7.5YR 5/4) clay loam; weak medium and coarse subangular blocky structure; firm; few very fine and fine roots; few discontinuous distinct brown (7.5YR 4/4) clay films on faces of peds; 6 percent rock fragments; neutral; gradual wavy boundary.

2BCk—38 to 52 inches; brown (7.5YR 5/4) loam; weak medium prismatic structure parting to weak coarse subangular blocky; firm; few very fine and fine roots; 8 percent rock fragments; slightly effervescent; moderately alkaline; gradual wavy boundary.

2C—52 to 80 inches; brown (7.5YR 5/4) loam; massive; friable; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 25 to 45 inches
Thickness of the loess: 20 to 40 inches

Ap or A horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—loam, clay loam, or silty clay loam

2C horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—loam or silt loam

Drummer Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform position: Nearly level summits on till plains
Parent material: Loess over glacial outwash
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Endoaquolls

Typical Pedon

Drummer silty clay loam, 0 to 2 percent slopes, 1,580 feet east and 1,840 feet north of the southwest corner of sec. 15, T. 12 N., R. 7 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; common very fine roots; moderately acid; abrupt smooth boundary.
A—10 to 14 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; common very fine roots; slightly acid; clear smooth boundary.
Bg1—14 to 19 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate medium subangular blocky structure; friable; common very fine roots; many continuous distinct black (10YR 2/1) organic coatings on faces of peds; few medium prominent yellowish brown (10YR 5/6) rounded soft iron masses with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.
Bg2—19 to 28 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate medium angular blocky structure; friable; few very fine roots; few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few medium prominent yellowish brown (10YR 5/6) rounded soft iron masses with diffuse boundaries throughout the matrix; black (10YR 2/1) krotovina; neutral; clear smooth boundary.
Bg3—28 to 46 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; many medium prominent yellowish brown (10YR 5/6) rounded soft iron masses with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.
Bg4—46 to 53 inches; grayish brown (2.5Y 5/2) silt loam; moderate medium prismatic structure; friable; few very fine roots; few discontinuous distinct dark brown (10YR 3/3) organic coatings on faces of peds; many medium prominent yellowish brown (10YR 5/6) rounded soft iron masses with diffuse boundaries throughout the matrix; common fine faint light brownish gray (2.5Y 6/2) irregular iron depletions with diffuse boundaries throughout the matrix; neutral; abrupt wavy boundary.
2Bg5—53 to 60 inches; grayish brown (2.5Y 5/2) sandy loam; strata of loam; weak medium prismatic structure; few very fine roots; many medium prominent yellowish brown (10YR 5/6) rounded soft iron masses with diffuse boundaries throughout the matrix; few pebbles; neutral.

Range in Characteristics

Depth to carbonates: 50 to 65 inches
Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR or N
Value—2 or 3
Chroma—0 to 2
Texture—silty clay loam

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 to 6
Texture—silty clay loam

2Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—loam, silt loam, or silty clay loam

2Cg horizon (if it occurs):
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—sandy loam, loam, silt loam, or silty clay loam

Elburn Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform position: Nearly level terraces and outwash plains
Parent material: Loess over glacial outwash
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Elburn silt loam, 0 to 2 percent slopes, 147 feet north and 742 feet east of the southwest corner of sec. 30, T. 13 N., R. 8 E.

Ap—0 to 6 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; weak very fine granular structure; friable; many very fine and fine roots; neutral; clear smooth boundary.
A—6 to 13 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular

blocky structure parting to moderate fine and medium granular; friable; many very fine and fine roots; slightly acid; gradual wavy boundary.

BA—13 to 17 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; common very fine and fine roots; many continuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine distinct dark grayish brown (10YR 4/2) iron depletions throughout the matrix; slightly acid; gradual wavy boundary.

Bt1—17 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots; common continuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common continuous distinct dark brown (10YR 3/3) clay films on faces of peds; many fine and medium strong brown (7.5YR 5/6) iron masses with diffuse boundaries throughout the matrix; common fine distinct dark grayish brown (10YR 4/2) iron depletions throughout the matrix; slightly acid; clear wavy boundary.

Bt2—28 to 38 inches; light olive brown (2.5Y 5/4) silty clay loam; moderate medium prismatic structure; friable; few fine roots; few continuous distinct very dark grayish brown (10YR 3/2) organic coatings in root channels and pores; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; many fine and medium strong brown (7.5YR 5/6) iron masses with diffuse boundaries throughout the matrix; many medium prominent grayish brown (2.5Y 5/2) iron depletions throughout the matrix; neutral; clear wavy boundary.

Bt3—38 to 50 inches; light olive brown (2.5Y 5/4) silt loam; moderate medium prismatic structure; friable; few very fine roots; few continuous distinct very dark grayish brown (10YR 3/2) organic coatings in root channels and pores; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; many fine and medium strong brown (7.5YR 5/8) iron masses with diffuse boundaries throughout the matrix; many medium prominent grayish brown (2.5Y 5/2) iron depletions throughout the matrix; neutral; clear wavy boundary.

2BC—50 to 61 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; many fine and medium strong brown (7.5YR 5/8) iron masses with diffuse boundaries throughout the matrix; common fine and medium grayish brown (2.5Y 5/2) iron depletions throughout the matrix; 10 percent rock fragments; strongly effervescent; slightly alkaline; gradual wavy boundary.

2C1—61 to 77 inches; yellowish brown (10YR 5/4) and light brownish gray (2.5Y 6/2) loamy sand; single grain; loose; common fine and medium strong brown (7.5YR 5/8) iron masses with diffuse boundaries throughout the matrix; 10 percent rock fragments; violently effervescent; moderately alkaline; abrupt wavy boundary.

2C2—77 to 80 inches; dark gray (5Y 4/1) silt loam; massive; violently effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 35 to 60 inches
Thickness of the mollic epipedon: 11 to 18 inches
Thickness of the loess: 40 to 60 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam or silt loam

2BC horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—sandy loam, loam, silt loam, or silty clay loam

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—sandy loam, loam, silt loam, or silty clay loam

Elkhart Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform position: Side slopes on till plains
Parent material: Loess
Slope range: 2 to 10 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls

Taxadjunct features: Elkhart silty clay loam, 5 to 10 percent slopes, eroded, does not have a mollic epipedon, which is definitive for the series, and Elkhart silt loam, 2 to 5 percent slopes, has a water table closer to the surface than is defined as the range for the series. These soils are classified as fine-silty, mixed, mesic Oxyaquic Hapludalfs.

Typical Pedon

Elkhart silt loam, 2 to 5 percent slopes, 1,780 feet east and 460 feet south of the northwest corner of sec. 14, T. 29 N., R. 2 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; moderately acid; clear smooth boundary.

A—9 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine roots; slightly acid; clear smooth boundary.

Bt1—13 to 21 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine roots; common discontinuous distinct dark brown (10YR 3/3) and brown (10YR 4/3) clay films on faces of peds; neutral; gradual wavy boundary.

BCk1—30 to 49 inches; yellowish brown (10YR 5/6) silt loam; weak coarse subangular blocky structure; friable; few very fine roots; common fine soft masses of carbonate throughout the matrix; common fine and medium light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCk2—49 to 80 inches; yellowish brown (10YR 5/6) silt loam; massive; friable; common medium and coarse carbonate nodules throughout the matrix; common medium light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 25 to 40 inches
Thickness of the mollic epipedon: 5 to 15 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR
Value—4 to 6
Chroma—2 to 6
Texture—silt loam or silty clay loam

C horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 to 8
Texture—silt loam

Elpaso Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform position: Nearly level summits on till plains
Parent material: Loess over glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Endoaquolls

Typical Pedon

Elpaso silty clay loam, 0 to 2 percent slopes, 120 feet north and 1,248 feet west of the southeast corner of sec. 20, T. 30 N., R. 1 W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, very dark grayish brown (10YR 3/2) dry; weak very fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

A—9 to 19 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; common very fine and fine roots; neutral; clear wavy boundary.

Bg—19 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate very fine subangular blocky structure; friable; few very fine roots; common distinct black (10YR 2/1) organic coatings on faces of peds; few fine prominent yellowish brown (10YR 5/4) rounded iron masses with clear boundaries throughout the matrix; slightly acid; clear wavy boundary.

Btg1—24 to 35 inches; grayish brown (2.5Y 5/2) silty clay loam; weak fine prismatic structure parting to

moderate fine subangular blocky; friable; few very fine roots; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; many fine prominent yellowish brown (10YR 5/4) rounded iron masses with clear boundaries throughout the matrix; common fine prominent black (10YR 2/1) rounded iron-manganese concretions with clear boundaries throughout the matrix; neutral; gradual wavy boundary.

Btg2—35 to 49 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium prismatic structure; friable; few very fine roots; many distinct grayish brown (2.5Y 5/2) clay films on faces of peds; many fine prominent yellowish brown (10YR 5/4) rounded iron masses with clear boundaries throughout the matrix; many fine prominent black (10YR 2/1) rounded iron-manganese concretions with clear boundaries throughout the matrix; neutral; gradual wavy boundary.

Btg3—49 to 56 inches; light brownish gray (2.5Y 6/2) silty clay loam; weak medium and coarse prismatic structure; friable; few very fine roots; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; many fine prominent yellowish brown (10YR 5/4) rounded iron masses with clear boundaries throughout the matrix; common fine prominent black (10YR 2/1) rounded iron-manganese concretions with clear boundaries throughout the matrix; slightly alkaline; clear wavy boundary.

2BCg—56 to 61 inches; light brownish gray (2.5Y 6/2) silty clay loam; weak coarse prismatic structure; friable; many fine prominent yellowish brown (10YR 5/4) rounded iron masses with clear boundaries throughout the matrix; few fine prominent black (10YR 2/1) rounded iron-manganese concretions with clear boundaries throughout the matrix; 4 percent rock fragments; slightly alkaline; gradual wavy boundary.

2C—61 to 80 inches; light olive brown (2.5Y 5/4) silty clay loam; massive; firm; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with clear boundaries throughout the matrix; many fine prominent black (10YR 2/1) rounded iron-manganese concretions with clear boundaries throughout the matrix; many fine distinct grayish brown (2.5Y 5/2) rounded iron depletions with distinct boundaries; 5 percent rock fragments; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 30 to 60 inches; average near 52 inches

Thickness of the mollic epipedon: 12 to 24 inches; average of 17 inches

Thickness of the loess: 40 to 60 inches; average of 54 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam or silt loam

Bg and Btg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silt loam, silty clay loam, or silty clay

2BCg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—loam, clay loam, silt loam, or silty clay loam

2C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam

Fayette Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Side slopes on till plains
Parent material: Loess
Slope range: 5 to 15 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Fayette silt loam, 10 to 15 percent slopes, 1,340 feet south and 1,740 feet west of the northeast corner of sec. 23, T. 13 N., R. 9 E.

Ap—0 to 6 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; moderate very fine granular structure; friable; many very fine and fine roots; strongly acid; gradual wavy boundary.

E—6 to 11 inches; yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) dry; moderate thin platy structure; friable; many very fine and fine roots; moderately acid; gradual wavy boundary.

Bt1—11 to 20 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; many continuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine prominent very dark gray (10YR 3/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; strongly acid; diffuse wavy boundary.

Bt2—20 to 38 inches; dark yellowish brown (10YR 4/6) silty clay loam; weak fine prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine and fine roots; many continuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent very dark gray (10YR 3/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; moderately acid; diffuse wavy boundary.

Bt3—38 to 60 inches; dark yellowish brown (10YR 4/6) silty clay loam; weak medium prismatic structure; friable; few very fine and fine roots; common discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent very dark gray (10YR 3/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; moderately acid; clear wavy boundary.

C—60 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; common fine and medium prominent light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; common fine prominent very dark gray (10YR 3/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 to 70 inches

Ap or A horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 3
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam or silty clay loam

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silt loam

Flanagan Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate or moderately slow
Landform position: Nearly level summits on till plains
Parent material: Loess over glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Flanagan silt loam, 0 to 2 percent slopes, 980 feet north and 138 feet west of the southeast corner of sec. 31, T. 29 N., R. 1 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak very fine and fine granular structure; friable; common very fine roots; neutral; clear smooth boundary.

A—9 to 13 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine and fine granular structure; friable; common very fine roots; slightly acid; clear smooth boundary.

BA—13 to 18 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine roots; common discontinuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine distinct yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; moderately acid; clear smooth boundary.

Bt1—18 to 29 inches; brown (10YR 5/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many discontinuous prominent dark gray (10YR 4/1) clay films on faces of peds; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine distinct light brownish gray (10YR 6/2) irregular iron depletions

throughout the matrix; slightly acid; gradual smooth boundary.

Bt2—29 to 42 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine roots; many discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine distinct light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; neutral; gradual wavy boundary.

2Btg—42 to 46 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; few discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; common fine distinct light gray (5Y 6/1) irregular iron depletions throughout the matrix; 2 percent rock fragments; slightly alkaline; gradual wavy boundary.

2BCkg—46 to 56 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure; firm; many fine and medium prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries, common fine rounded iron-manganese nodules with diffuse boundaries, and common fine irregular carbonate nodules throughout the matrix; common fine distinct light gray (5Y 6/1) iron depletions throughout the matrix; 2 percent rock fragments; strongly effervescent; slightly alkaline; gradual wavy boundary.

2C—56 to 80 inches; olive brown (2.5Y 4/4) silty clay loam; massive; firm; few fine and medium prominent light gray (5Y 6/1) irregular iron depletions throughout the matrix; 2 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 55 inches
Thickness of the mollic epipedon: 7 to 20 inches
Thickness of the loess: 40 to 60 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 6
Texture—silt loam, silty clay loam, or silty clay

2Btg and 2BCkg horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—loam, silt loam, or silty clay loam

2C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—loam, silt loam, or silty clay loam

Graymont Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 2 to 10 percent

Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Argiudolls

Taxadjunct features: The Graymont soils in this survey area do not have a mollic epipedon, which is definitive for the series. These soils are classified as fine-silty, mixed, mesic Oxyaquic Hapludalfs.

Typical Pedon

Graymont silty clay loam, 2 to 5 percent slopes, eroded, 2,508 feet south and 1,060 feet west of the northeast corner of sec. 31, T. 29 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; many very fine and fine roots; neutral; abrupt smooth boundary.

Bt1—9 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and very fine subangular blocky structure; friable; many very fine and fine roots; many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear wavy boundary.

Bt2—14 to 20 inches; yellowish brown (10YR 5/4) silty

clay loam; moderate fine subangular blocky structure; friable; many very fine and fine roots; many discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; gradual wavy boundary.

Bt3—20 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; common very fine and fine roots; many discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine prominent grayish brown (2.5Y 5/2) irregular iron depletions throughout the matrix; neutral; clear wavy boundary.

2Bt4—29 to 36 inches; light olive brown (2.5Y 5/4) silty clay loam; moderate medium prismatic structure; firm; few very fine and fine roots; many discontinuous distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few fine prominent olive gray (5Y 5/2) irregular iron depletions throughout the matrix; 2 percent rock fragments; strongly effervescent (starting at a depth of 32 inches); slightly alkaline; clear wavy boundary.

2Btk—36 to 43 inches; light olive brown (2.5Y 5/4) silty clay loam; moderate coarse prismatic structure; firm; few very fine and fine roots; few discontinuous distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few fine prominent light gray (10YR 7/1) soft masses of carbonate throughout the matrix; few fine prominent olive gray (5Y 5/2) iron depletions throughout the matrix; 2 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C—43 to 80 inches; light olive brown (2.5Y 5/4) silty clay loam; massive; firm; 2 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches; average of 36 inches

Thickness of the mollic epipedon: 6 to 20 inches; average of 10 inches

Thickness of the loess: 20 to 40 inches; average of 30 inches

Ap horizon:

Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam

Bt horizon:

Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam, silt loam, or silty clay

2Bt and 2Btk horizons:

Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam, loam, or clay loam

2C horizon:

Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam

Harco Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform position: Nearly level summits on till plains
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Harco silt loam, 0 to 2 percent slopes, 1,140 feet east and 240 feet south of the northwest corner of sec. 14, T. 29 N., R. 2 W.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

A—8 to 15 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; many very fine roots; slightly acid; clear smooth boundary.

Bt1—15 to 20 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common very fine roots; many discontinuous faint dark gray (10YR 4/1) clay films on faces of peds; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Bt2—20 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine roots; many discontinuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; many fine

prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; slightly acid; gradual wavy boundary.

BCk—31 to 43 inches; grayish brown (2.5Y 5/2) silt loam; weak coarse subangular blocky structure; friable; few very fine roots; many fine and medium distinct light olive brown (2.5Y 5/4) and common fine prominent yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; common fine distinct light gray (5Y 6/1) irregular iron depletions throughout the matrix; strongly effervescent; moderately alkaline; gradual wavy boundary.

C—43 to 80 inches; mixed light olive brown (2.5Y 5/4), yellowish brown (10YR 5/6), and light brownish gray (2.5Y 6/2) silt loam; massive; friable; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 25 to 40 inches
Thickness of the mollic epipedon: 10 to 20 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam

Bt and BCk horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silt loam or silty clay loam

C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silt loam

Hartsburg Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform position: Nearly level summits on till plains
Parent material: Reworked loess
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Endoaquolls

Typical Pedon

Hartsburg silty clay loam, 0 to 2 percent slopes, 138 feet west and 516 feet north of the southeast corner of sec. 20, T. 29 N., R. 1 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; many very fine and fine roots; neutral; abrupt smooth boundary.

A—9 to 17 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate very fine and fine subangular blocky structure; friable; common very fine roots; neutral; clear wavy boundary.

Bg1—17 to 24 inches; dark gray (5Y 4/1) silty clay loam; weak very fine prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; many continuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine prominent dark yellowish brown (10YR 4/6) rounded iron masses with clear boundaries throughout the matrix; very dark gray (10YR 3/1) krotovina; neutral; clear wavy boundary.

Bg2—24 to 32 inches; olive gray (5Y 5/2) silty clay loam; moderate fine and medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; few discontinuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine prominent yellowish brown (10YR 5/6) rounded iron masses with clear boundaries throughout the matrix; slightly alkaline; clear wavy boundary.

BCkg—32 to 49 inches; light olive gray (5Y 6/2) silty clay loam; weak medium and coarse prismatic structure; friable; few very fine roots; many fine prominent yellowish brown (10YR 5/6) rounded iron masses with clear boundaries throughout the matrix; very dark gray (10YR 3/1) krotovina; few snail shells; slightly effervescent; slightly alkaline; gradual wavy boundary.

Cg—49 to 75 inches; light olive gray (5Y 6/2) silt loam; massive; friable; many fine prominent yellowish brown (10YR 5/6) rounded iron masses with clear boundaries throughout the matrix; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 15 to 35 inches
Thickness of the mollic epipedon: 11 to 24 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

Bg and BCkg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silt loam or silty clay loam

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silt loam

Hennepin Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform position: Side slopes on till plains
Parent material: Glacial till
Slope range: 25 to 60 percent

Taxonomic classification: Fine-loamy, mixed, mesic Typic Eutrochrepts

Typical Pedon

Hennepin loam, 35 to 60 percent slopes, 2,020 feet north and 900 feet east of the southwest corner of sec. 24, T. 12 N., R. 9 E.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very fine to coarse roots; 5 percent rock fragments; slightly alkaline; clear smooth boundary.
Bw1—3 to 5 inches; brown (10YR 4/3) loam; moderate very fine subangular blocky structure; friable; many very fine to coarse roots; common discontinuous distinct dark brown (10YR 3/3) organic coatings on faces of peds; 5 percent rock fragments; slightly effervescent; slightly alkaline; clear smooth boundary.
Bw2—5 to 16 inches; dark yellowish brown (10YR 4/4) loam; moderate fine and medium subangular blocky structure; friable; common very fine to coarse roots; common discontinuous distinct dark brown (10YR 3/3) organic coatings on faces of peds; 8 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.
C—16 to 80 inches; brown (7.5YR 4/4) loam; massive; firm; few very fine and fine roots; 10 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 0 to 15 inches
Thickness of the loess: 0 to 6 inches

A horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 3
Texture—loam or silt loam

Bw horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—loam or clay loam

C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—loam or clay loam

Ipava Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform position: Nearly level summits on till plains
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Ipava silt loam, 0 to 2 percent slopes, 1,386 feet south and 87 feet west of the center of sec. 28, T. 12 N., R. 8 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.
A—8 to 18 inches; black (10YR 2/1) silty clay loam; moderate fine granular structure; friable; many very fine roots; slightly acid; clear smooth boundary.
Bt1—18 to 24 inches; olive brown (2.5Y 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine roots; many continuous distinct black (10YR 2/1) organic coatings and common continuous distinct dark

grayish brown (2.5Y 4/2) clay films on faces of peds; common fine faint dark grayish brown (2.5Y 4/2) irregular iron depletions throughout the matrix; slightly acid; clear smooth boundary.

Bt2—24 to 33 inches; light olive brown (2.5Y 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; many continuous distinct dark grayish brown (2.5Y 4/2) clay films and common continuous distinct very dark brown (10YR 2/2) organic coatings on faces of peds; common fine prominent yellowish brown (10YR 5/6) irregular iron masses with diffuse boundaries and common fine prominent dark yellowish brown (10YR 3/6) rounded iron and manganese oxide nodules throughout the matrix; many fine distinct light brownish gray (2.5Y 6/2) irregular iron depletions throughout the matrix; slightly acid; clear smooth boundary.

Bt3—33 to 42 inches; light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; many continuous distinct dark grayish brown (2.5Y 4/2) clay films and common continuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine prominent yellowish brown (10YR 5/6) irregular iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron and manganese oxide nodules throughout the matrix; neutral; clear smooth boundary.

Bt4—42 to 49 inches; yellowish brown (10YR 5/4) and light brownish gray (2.5Y 6/2) silty clay loam; weak medium prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; many continuous distinct black (10YR 2/1) organic coatings in root channels and common discontinuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) irregular iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron and manganese oxide nodules throughout the matrix; neutral; clear wavy boundary.

BCkg—49 to 78 inches; light brownish gray (2.5Y 6/2) silt loam; weak coarse prismatic structure; friable; many fine prominent yellowish brown (10YR 5/8) irregular iron masses with diffuse boundaries throughout the matrix; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg—78 to 80 inches; light brownish gray (2.5Y 6/2) silt loam; massive; friable; many fine and medium prominent yellowish brown (10YR 5/8) irregular iron masses with diffuse boundaries throughout the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to more than 60 inches
Thickness of the mollic epipedon: 8 to 21 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt and BCkg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silt loam or silty clay loam

Cg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 to 6
Texture—silt loam

Jules Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform position: Flood plains
Parent material: Silty alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Coarse-silty, mixed, calcareous, mesic Typic Udifluvents

Typical Pedon

Jules silt loam, 0 to 2 percent slopes, frequently flooded, in a cultivated field, 2,200 feet east and 75 feet south of the northwest corner of sec. 36, T. 10 N., R. 6 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common yellowish brown (10YR 5/4) fragments of material from the C horizon; moderate medium granular structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly effervescent; moderately alkaline; clear smooth boundary.

C1—8 to 18 inches; stratified dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and yellowish brown (10YR 5/4) silt loam that has thin strata of loam; moderate thin bedding planes

resulting from stratification; massive; friable; few very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

C2—18 to 32 inches; stratified dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and yellowish brown (10YR 5/4) silt loam that has thin strata of very fine sandy loam and loam; moderate thin bedding planes resulting from stratification; massive; friable; few very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

C3—32 to 46 inches; stratified, dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and yellowish brown (10YR 5/4) silt loam, loamy fine sand, and loam; moderate thin bedding planes resulting from stratification; massive; friable; slightly effervescent; moderately alkaline; clear smooth boundary.

C4—46 to 60 inches; stratified, brown (10YR 4/3), dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and yellowish brown (10YR 5/4) silt loam, loamy fine sand, and loam; moderate thin bedding planes resulting from stratification; massive; friable; common fine soft black (10YR 2/1) accumulations of iron and manganese oxide; slightly effervescent; moderately alkaline.

Range in Characteristics

Carbonates: At the surface
Thickness of the solum: 6 to 10 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam

C horizon:
Hue—10YR
Value—3 to 6
Chroma—2 to 4
Texture—silt, silt loam, loam, or sandy loam

Keomah Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow or moderately slow
Landform position: Side slopes or nearly level summits on till plains
Parent material: Loess
Slope range: 0 to 5 percent

Taxonomic classification: Fine, smectitic, mesic Aeric Ochraqualfs

Typical Pedon

Keomah silt loam, 0 to 2 percent slopes, 168 feet north and 798 feet east of the southwest corner of sec. 35, T. 12 N., R. 8 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; many fine and medium roots; neutral; abrupt smooth boundary.

E—10 to 13 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; moderate fine subangular blocky structure; friable; common fine and medium roots; neutral; clear smooth boundary.

BE—13 to 16 inches; dark grayish brown (10YR 4/2) silty clay loam, light gray (10YR 7/2) dry; moderate fine subangular blocky structure; friable; common fine and medium roots; few fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; slightly acid; clear wavy boundary.

Bt1—16 to 23 inches; dark yellowish brown (10YR 4/4) silty clay; weak fine prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine and medium roots; many prominent dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and many fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine prominent light brownish gray (2.5Y 6/2) irregular iron depletions lining pores; strongly acid; gradual wavy boundary.

Bt2—23 to 34 inches; olive brown (2.5Y 4/4) silty clay loam; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many prominent dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; many fine prominent yellowish brown (10YR 5/8) rounded iron masses with diffuse boundaries and many fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; many fine distinct light brownish gray (2.5Y 6/2) irregular iron depletions throughout the matrix and lining pores; slightly acid; gradual wavy boundary.

Bt3—34 to 40 inches; light olive brown (2.5Y 5/6) silty clay loam; moderate medium prismatic structure; friable; few fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; many fine prominent yellowish brown (10YR 5/8) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; many fine prominent light brownish gray (2.5Y 6/2) irregular iron depletions throughout the matrix and lining pores; neutral; gradual wavy boundary.

BCkg—40 to 55 inches; 55 percent light brownish gray (2.5Y 6/2) and 45 percent yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure; friable; common medium and coarse light gray (10YR 7/2) irregular carbonate nodules throughout the matrix; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg—55 to 80 inches; 60 percent light brownish gray (2.5Y 6/2) and 40 percent yellowish brown (10YR 5/6) silt loam; massive; friable; few fine and medium light gray (10YR 7/2) irregular carbonate nodules throughout the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 42 to more than 60 inches; average of 50 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 4
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—1 to 3
Texture—silt loam

BE, Bt, and BCkg horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silt loam or silty clay loam

Cg horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—2 to 6
Texture—silt loam

Landes Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Landform position: Flood plains
Parent material: Loamy and sandy alluvium
Slope range: 2 to 5 percent

Taxonomic classification: Coarse-loamy, mixed, mesic Fluventic Hapludolls

Typical Pedon

Landes fine sandy loam, 2 to 5 percent slopes, occasionally flooded, 40 feet north and 2,220 feet west of the southeast corner of sec. 30, T. 29 N., R. 2 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak very fine subangular blocky structure; very friable; many very fine roots; 1 percent rock fragments; moderately acid; clear smooth boundary.

A—9 to 20 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; very friable; common very fine roots; 1 percent rock fragments; slightly acid; gradual wavy boundary.

Bw—20 to 26 inches; brown (10YR 4/3) fine sandy loam; weak fine and medium subangular blocky structure; very friable; few very fine roots; many discontinuous distinct dark brown (10YR 3/3) organic coatings on faces of peds; 1 percent rock fragments; neutral; gradual wavy boundary.

BC—26 to 43 inches; dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; 1 percent rock fragments; slightly effervescent; slightly alkaline; gradual wavy boundary.

C—43 to 80 inches; yellowish brown (10YR 5/4) sand; single grain; loose; 10 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 5 to 50 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—loamy sand, sandy loam, or loam

Bw horizon:
Hue—10YR
Value—3 to 5
Chroma—3 or 4
Texture—sandy loam, loamy sand, loam, or sand

C horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—sand, sandy loam, loamy sand, or loam

La Rose Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform position: Side slopes on till plains
Parent material: Glacial till
Slope range: 5 to 15 percent

Taxonomic classification: Fine-loamy, mixed, mesic Typic Argiudolls
Taxadjunct features: The La Rose soils in this survey area do not have a mollic epipedon, which is definitive for the series. These soils are classified as fine-loamy, mixed, mesic Mollic Hapludalfs.

Typical Pedon

La Rose silty clay loam, 5 to 10 percent slopes, eroded, 270 feet south and 804 feet east of the northwest corner of sec. 10, T. 12 N., R. 8 E.

Ap—0 to 7 inches; mixed very dark grayish brown (10YR 3/2) and brown (10YR 4/3) silty clay loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; common fine and medium roots; 5 percent rock fragments; neutral; abrupt smooth boundary.
Bt1—7 to 12 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; common continuous distinct brown (10YR 4/3) clay films on faces of peds; 5 percent rock fragments; neutral; gradual wavy boundary.
Bt2—12 to 17 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; 5 percent rock fragments; neutral; clear wavy boundary.
Bt3—17 to 23 inches; yellowish brown (10YR 5/4) loam; weak medium and coarse prismatic structure; firm; few fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent rock fragments; strongly effervescent; slightly alkaline; diffuse wavy boundary.
C—23 to 80 inches; yellowish brown (10YR 5/4) loam; massive; firm; 5 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 10 to 24 inches
Thickness of the surface layer: 5 to 12 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—loam, silt loam, or silty clay loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—clay loam

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 to 8
Texture—loam or silt loam

Littleton Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform position: Flood plains
Parent material: Silty alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Aquic Cumulic Hapludolls

Typical Pedon

Littleton silt loam, 0 to 2 percent slopes, rarely flooded, 1,150 feet west and 312 feet north of the southeast corner of sec. 1, T. 14 N., R. 10 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common fine roots; slightly acid; clear smooth boundary.
A—7 to 18 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak fine granular; friable; common fine roots; slightly acid; clear smooth boundary.
AB—18 to 26 inches; very dark gray (10YR 3/1) silty

clay loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

Bt1—26 to 37 inches; brown (10YR 4/3) silty clay loam; common fine faint yellowish brown (10YR 5/4) mottles; strong medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt2—37 to 47 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and common fine faint brown (10YR 4/3) mottles; strong medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—47 to 60 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; few very fine roots; few distinct black (10YR 2/1) organic coatings in root channels; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid.

Range in Characteristics

Depth to carbonates: 45 to more than 60 inches
Thickness of the mollic epipedon: 24 to 30 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silt loam

Marseilles Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate in the upper part and slow in the lower part
Landform: Side slopes on till plains
Parent material: Weathered shale
Slope range: 35 to 60 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Marseilles silt loam, 35 to 60 percent slopes, 2,480 feet east and 560 feet north of the southwest corner of sec. 34, T. 12 N., R. 9 E.

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine and fine granular structure; friable; many very fine and fine roots; moderately acid; abrupt smooth boundary.

2Bt1—2 to 5 inches; light olive brown (2.5Y 5/3) silty clay loam; moderate fine subangular blocky structure; friable; many very fine and fine roots; few discontinuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; about 30 percent soft shale channers; moderately acid; clear wavy boundary.

2Bt2—5 to 13 inches; olive (5Y 5/3) silty clay loam; moderate fine subangular blocky structure; firm; common very fine to coarse roots; few discontinuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; about 40 percent soft shale channers; moderately acid; gradual wavy boundary.

2Bt3—13 to 22 inches; 90 percent olive (5Y 5/3) and 10 percent yellowish brown (10YR 5/4) silty clay loam; weak medium subangular blocky structure; firm; common very fine and fine roots; few discontinuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; about 50 percent soft shale channers; moderately acid; gradual wavy boundary.

2BC—22 to 38 inches; 75 percent olive (5Y 5/3) and 25 percent yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; very firm; few very fine and fine roots; about 90 percent soft shale channers; moderately acid; gradual wavy boundary.

2Cr—38 to 80 inches; 50 percent grayish brown (2.5Y 5/2) and 50 percent yellowish brown (10YR 5/4) soft shale; massive; extremely firm; moderately acid.

Range in Characteristics

Depth to bedrock: 0 to 20 inches

A horizon:
Hue—10YR
Value—2 to 4
Chroma—2 or 3

Texture—silt loam

2Bt and 2BC horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam

2Cr horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Type of bedrock—shale

Martinsville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform position: Terrace side slopes and nearly level summits
Parent material: Glacial outwash
Slope range: 0 to 10 percent

Taxonomic classification: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Martinsville silt loam, 0 to 2 percent slopes, 2,420 feet north and 80 feet west of the southeast corner of sec. 5, T. 30 N., R. 4 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

AE—8 to 12 inches; brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine subangular blocky structure; friable; common very fine roots; moderately acid; clear wavy boundary.

Bt1—12 to 20 inches; dark yellowish brown (10YR 4/4) clay loam; moderate very fine and fine subangular blocky structure; friable; common very fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear wavy boundary.

Bt2—20 to 29 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; 2 percent rock fragments; strongly acid; clear wavy boundary.

Bt3—29 to 38 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium prismatic structure; friable; few very fine roots; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct black (10YR 2/1) rounded iron-manganese concretions with sharp boundaries; 2 percent rock fragments; strongly acid; gradual wavy boundary.

Bt4—38 to 46 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium and coarse prismatic structure; friable; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct black (10YR 2/1) rounded iron-manganese concretions with sharp boundaries; 2 percent rock fragments; strongly acid; clear wavy boundary.

Bt5—46 to 62 inches; yellowish brown (10YR 5/4) loam; weak coarse prismatic structure; very friable; common discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct black (10YR 2/1) rounded iron-manganese concretions with sharp boundaries; 2 percent rock fragments; 7 inches of loamy fine sand strata; moderately acid; gradual wavy boundary.

C—62 to 80 inches; yellowish brown (10YR 5/4), stratified sandy loam and loam; massive; friable; 2 percent rock fragments; slightly acid.

Range in Characteristics

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 to 4
Texture—loam, sandy loam, or silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—sandy loam, loam, or clay loam

C horizon:
Hue—10YR
Value—4 to 6
Chroma—4 to 6
Texture—sand, sandy loam, loam, clay loam, or silt loam

Morley Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow in the upper part and slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 25 to 35 percent

Taxonomic classification: Fine, illitic, mesic Oxyaquic Hapludalfs

Typical Pedon

Morley silt loam, 25 to 35 percent slopes, 1,480 feet north and 320 feet west of the southeast corner of sec. 17, T. 31 N., R. 1 W.

A—0 to 3 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; common fine and medium roots; few fine concretions of iron and manganese oxide; few pebbles; slightly acid; clear smooth boundary.

E—3 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak thick platy structure parting to weak fine subangular blocky; friable; common fine and medium roots; few fine concretions of iron and manganese oxide; few pebbles; slightly acid; clear smooth boundary.

BE—7 to 10 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium subangular blocky structure; friable; common very fine and fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; few pebbles; slightly acid; clear smooth boundary.

Bt1—10 to 18 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; firm; common very fine and fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; few pebbles; slightly acid; clear smooth boundary.

Bt2—18 to 28 inches; brown (10YR 4/3) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few very fine roots; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; common pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

BC—28 to 37 inches; olive brown (2.5Y 4/4) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very firm; few very fine roots; few fine concretions of iron and manganese oxide; common pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

C—37 to 60 inches; olive brown (2.5Y 4/4) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; massive; very firm; few very fine roots; few fine concretions of iron and manganese oxide; common pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 15 to 45 inches
Thickness of the loess: 0 to 15 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or loam

Bt and BC horizons:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or clay loam

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam or clay loam

Moundprairie Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Flood plains
Parent material: Silty alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, calcareous, mesic Mollic Fluvaquents

Typical Pedon

Moundprairie silty clay loam, 0 to 2 percent slopes, frequently flooded, long duration, 50 feet north and 3,500 feet west of the southeast corner of sec. 11, T. 29 N., R. 3 W.

A—0 to 10 inches; strata of very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2) silty clay loam, silt loam, and loam; dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; common very fine roots; 2 percent rock fragments; slightly effervescent; slightly alkaline; clear smooth boundary.

Cg—10 to 48 inches; very dark gray (10YR 3/1) and olive brown (2.5Y 4/4) silty clay loam; weak fine subangular blocky structure; friable; common very

fine roots; common fine distinct strong brown (7.5YR 4/6) iron masses with clear boundaries and common fine and medium distinct black (10YR 2/1) rounded iron-manganese concretions with clear boundaries throughout the matrix; common fine distinct gray (5Y 5/1) iron depletions throughout the matrix; strongly effervescent; slightly alkaline; clear smooth boundary.

Ab—48 to 80 inches; black (N 2/0) silty clay loam; weak fine and medium subangular blocky structure; friable; few very fine roots; common fine distinct strong brown (7.5YR 4/6) irregular iron masses with clear boundaries throughout the matrix; strongly effervescent; slightly alkaline.

Range in Characteristics

Carbonates: At the surface
Thickness of recent sediments: 40 to 60 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam, silt loam, or loam

C horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—1 or 2
Texture—silt loam, silty clay loam, loam, sandy loam, or loamy sand

Ab horizon:
Hue—10YR, 5Y, or N
Value—2 or 3
Chroma—0 or 1
Texture—silt loam or silty clay loam

Muscatune Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform position: Nearly level summits on till plains
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Muscatune silt loam, 0 to 2 percent slopes, 2,424 feet north and 216 feet west of the southeast corner of sec. 23, T. 13 N., R. 8 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

A—9 to 17 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; many very fine roots; slightly acid; clear smooth boundary.

BA—17 to 22 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine roots; many discontinuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Btg1—22 to 28 inches; dark grayish brown (2.5Y 4/2) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; common discontinuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine prominent yellowish brown (10YR 5/4) iron masses with diffuse boundaries and common fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Btg2—28 to 37 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine roots; common discontinuous distinct very dark gray (10YR 3/1) organic coatings and few discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/4) iron masses with diffuse boundaries and common fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Btg3—37 to 46 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; common discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine and medium prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries and common fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; gradual smooth boundary.

BCg—46 to 54 inches; grayish brown (2.5Y 5/2) silt loam; weak coarse prismatic structure; friable; few very fine roots; many fine and medium prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries and common fine and medium rounded iron-manganese nodules with diffuse boundaries throughout the matrix; common fine

distinct light gray (10YR 6/1) iron depletions throughout the matrix; neutral; gradual smooth boundary.

Cg—54 to 80 inches; grayish brown (2.5Y 5/2) silt loam; massive; friable; many fine and medium prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; many fine and medium distinct light gray (10YR 6/1) iron depletions throughout the matrix; very slightly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to more than 60 inches
Thickness of the mollic epipedon: 8 to 21 inches

Ap and A horizons:
Hue—10YR
Value—2
Chroma—1 or 2
Texture—silt loam or silty clay loam

Btg and BCg horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silt loam or silty clay loam

Cg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—2 to 4
Texture—silt loam

New Vienna Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform position: Side slopes on till plains
Parent material: Loess
Slope range: 2 to 5 percent

Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Hapludalfs

Typical Pedon

New Vienna silt loam, 2 to 5 percent slopes, 339 feet north and 1,036 feet east of the center of sec. 3, T. 13 N., R. 9 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

BE—7 to 10 inches; brown (10YR 4/3) silty clay loam, light brownish gray (10YR 6/2) dry; weak medium platy structure parting to moderate very fine subangular blocky; friable; common very fine roots; many discontinuous distinct light gray (10YR 7/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine roots; many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—16 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and few fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; moderately acid; clear smooth boundary.

Bt3—24 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) rounded iron masses with diffuse boundaries and common fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; clear smooth boundary.

BC1—33 to 46 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common fine and medium distinct yellowish brown (10YR 5/6) and common fine distinct brown (10YR 5/3) rounded iron masses with diffuse boundaries and common fine rounded black (10YR 2/1) iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.

BC2—46 to 53 inches; yellowish brown (10YR 5/4) silt loam; weak medium prismatic structure; friable; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; strongly effervescent; moderately alkaline; gradual wavy boundary.

C—53 to 80 inches; yellowish brown (10YR 5/4) silt

loam; massive; friable; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to more than 60 inches
Thickness of the mollic epipedon: 5 to 10 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture—silt loam

Bt, BC, and BCk horizons:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silt loam

Onarga Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Landform position: Terrace side slopes and nearly level summits
Parent material: Eolian deposits
Slope range: 0 to 10 percent

Taxonomic classification: Coarse-loamy, mixed, mesic Typic Argiudolls

Typical Pedon

Onarga sandy loam, 0 to 2 percent slopes, 402 feet south and 54 feet east of the center of sec. 20, T. 13 N., R. 10 E.

Ap—0 to 8 inches; dark brown (10YR 3/2) sandy loam, brown (10YR 5/3) dry; weak very fine granular structure; very friable; many very fine and fine roots; moderately acid; abrupt smooth boundary.

A—8 to 12 inches; dark brown (10YR 3/2) sandy loam, brown (10YR 5/3) dry; weak very fine granular structure; very friable; common very fine and fine roots; moderately acid; clear wavy boundary.

Bt1—12 to 18 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine subangular blocky structure; very friable; few very fine roots; common discontinuous distinct dark brown (10YR 3/3) organic coatings on faces of peds; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual wavy boundary.

Bt2—18 to 28 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine and medium subangular blocky structure; friable; few very fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual wavy boundary.

Bt3—28 to 48 inches; dark yellowish brown (10YR 4/4) loamy sand (contains thin strata of sandy loam); weak medium subangular blocky structure; very friable; few very fine roots; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; diffuse wavy boundary.

C1—48 to 68 inches; dark yellowish brown (10YR 4/6) loamy sand (contains thin strata of sand); single grain; loose; slightly acid; clear wavy boundary.

C2—68 to 80 inches; yellowish brown (10YR 5/6) gravelly sand; single grain; loose; 30 percent rock fragments; strongly effervescent (carbonates start at a depth of 73 inches); slightly alkaline.

Range in Characteristics

Depth to carbonates: 45 to more than 70 inches
Thickness of the mollic epipedon: 10 to 15 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—sandy loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam, loam, sandy loam, or loamy sand

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—stratified loamy sand and sand

Osco Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform position: Side slopes on till plains
Parent material: Loess
Slope range: 2 to 10 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: Osco silty clay loam, 2 to 5 percent slopes, eroded, and Osco silty clay loam, 5 to 10 percent slopes, eroded, do not have a mollic epipedon, which is definitive for the series. Osco silty clay loam, 2 to 5 percent slopes, eroded, and Osco silt loam, 2 to 5 percent slopes, have a water table closer to the surface than is defined as the range for the series.

Typical Pedon

Osco silt loam, 2 to 5 percent slopes, 760 feet north and 285 feet east of the southwest corner of sec. 13, T. 13 N., R. 8 E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; friable; common very fine roots; neutral; clear smooth boundary.

A—9 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; common very fine roots; many discontinuous distinct very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BA—11 to 14 inches; brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine roots; many discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—14 to 19 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; common discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings and common discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—19 to 29 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings and many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and common fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; common fine distinct light brownish gray (10YR 6/2) iron depletions throughout the matrix; moderately acid; clear smooth boundary.

Bt3—29 to 43 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine roots; few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and common fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine distinct light brownish gray (10YR 6/2) iron depletions throughout the matrix; slightly acid; gradual smooth boundary.

BC—43 to 51 inches; yellowish brown (10YR 5/4) silt loam; weak medium prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; common fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; common fine distinct light brownish gray (10YR 6/2) iron depletions throughout the matrix; neutral; gradual wavy boundary.

C—51 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; many fine and medium distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries throughout the matrix; common fine and medium distinct light brownish gray (10YR 6/2) iron depletions throughout the matrix; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to more than 60 inches
Thickness of the mollic epipedon: 7 to 18 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y

Value—4 to 6
Chroma—3 or 4
Texture—silty clay loam or silt loam

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

Plano Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform position: Nearly level summits and side slopes on terraces and outwash plains
Parent material: Loess over glacial outwash
Slope range: 0 to 5 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls

Typical Pedon

Plano silt loam, 0 to 2 percent slopes, 1,640 feet north and 2,540 feet west of the southeast corner of sec. 16, T. 29 N., R. 1 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; many very fine and fine roots; neutral; clear smooth boundary.

A—8 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very fine and fine roots; neutral; clear wavy boundary.

Bt1—12 to 21 inches; brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; many continuous distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear wavy boundary.

Bt2—21 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear wavy boundary.

Bt3—28 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine and fine roots; common discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; gradual wavy boundary.

Bt4—40 to 56 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and coarse prismatic structure; friable; few very fine roots; common discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; moderately acid; gradual wavy boundary.

2BC—56 to 64 inches; yellowish brown (10YR 5/4) loam; weak coarse prismatic structure; friable; few very fine roots; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; moderately acid; gradual wavy boundary.

2C1—64 to 70 inches; yellowish brown (10YR 5/4) loam; massive; friable; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; moderately acid; clear wavy boundary.

3C2—70 to 80 inches; yellowish brown (10YR 5/4), stratified gravelly clay loam and gravelly loamy sand; massive or single grain; very friable or loose; 40 percent rock fragments; slightly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 18 inches
Thickness of the loess: 40 to 60 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam

2BC horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—sandy loam, loam, or silty clay loam

2C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—3 to 5
Chroma—2 to 6
Texture—loamy sand, sandy loam, loam, clay loam, gravelly clay loam, or gravelly loamy sand

Proctor Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform position: Side slopes on terraces and outwash plains
Parent material: Loess over glacial outwash
Slope range: 2 to 5 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls

Typical Pedon

Proctor silt loam, 2 to 5 percent slopes, 2,360 feet east and 1,240 feet north of the southwest corner of sec. 33, T. 12 N., R. 7 E.

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; common very fine roots; moderately acid; abrupt smooth boundary.

A—8 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; common very fine roots; slightly acid; clear smooth boundary.

Bt1—12 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium angular blocky structure; friable; common very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings and brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—16 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium angular blocky structure; friable; common very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—23 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt4—29 to 35 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2BC—35 to 60 inches; dark yellowish brown (10YR 4/4), stratified sandy loam and loamy sand; weak medium prismatic structure; very friable; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 18 inches
Thickness of the loess: 20 to 40 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam

2Bt and 2BC horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—loam, loamy sand, sandy clay loam, or sandy loam

2C horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 8
Texture—sandy loam, loamy sand, loam, or clay loam

Radford Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform position: Flood plains
Parent material: Silty alluvium over buried soil
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Fluvaquentic Hapludolls

Typical Pedon

Radford silt loam, 0 to 2 percent slopes, occasionally flooded, 760 feet north and 2,180 feet east of the southwest corner of sec. 7, T. 12 N., R. 8 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; common fine and medium roots; neutral; abrupt smooth boundary.

A—7 to 21 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine

granular structure; friable; common fine and medium roots; neutral; gradual smooth boundary.

C—21 to 35 inches; stratified very dark gray (10YR 3/1), dark grayish brown (10YR 4/2), and dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; slightly alkaline; gradual wavy boundary.

Ab—35 to 50 inches; black (10YR 2/1) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; slightly alkaline; gradual wavy boundary.

Bgb—50 to 66 inches; light olive gray (5Y 6/2) silty clay loam; weak medium and coarse prismatic structure; friable; few distinct very dark gray (10YR 3/1) organic coatings lining pores and on faces of peds; many fine prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries throughout the matrix; slightly alkaline; gradual wavy boundary.

C´—66 to 80 inches; light olive gray (5Y 6/2) silty clay loam; massive; friable; many fine prominent yellowish brown (10YR 5/6) iron masses with diffuse boundaries throughout the matrix; very slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to buried soil: 20 to 40 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

C horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 3
Texture—silt loam or silty clay loam

Ab horizon:
Hue—10YR or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam or silt loam

Bgb horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 or 2
Texture—silty clay loam or silt loam

Raveenwash Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately rapid
Landform position: Flood plains
Parent material: Loamy and sandy alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Coarse-loamy, mixed, calcareous, mesic Aquic Udifluvents

Typical Pedon

Raveenwash silt loam, 0 to 2 percent slopes, occasionally flooded, 1,940 feet south and 1,900 feet west of the northeast corner of sec. 4, T. 30 N., R. 2 W.

A—0 to 5 inches; mixed very dark grayish brown (10YR 3/2) and brown (10YR 4/3) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; 5 percent rock fragments; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—5 to 9 inches; brown (10YR 4/3) sand; single grain; loose; few very fine roots; 2 percent rock fragments; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—9 to 33 inches; stratified, very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2), and brown (10YR 5/3) silt loam and loamy sand; thin bedding planes along strata; very friable; few very fine and medium roots; common fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries throughout the matrix; many fine and medium faint grayish brown (2.5Y 5/2) iron depletions; 2 percent rock fragments; strongly effervescent; moderately alkaline; gradual smooth boundary.

C3—33 to 40 inches; dark grayish brown (10YR 4/2), stratified loam, sandy loam, and loamy sand; thin bedding planes along strata; very friable; few very fine roots; common fine faint yellowish brown (10YR 5/4) iron masses with diffuse boundaries throughout the matrix; 2 percent rock fragments; strongly effervescent; moderately alkaline; gradual smooth boundary.

C4—40 to 53 inches; stratified, very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2 and 2.5Y 4/2) loam, silt loam, and loamy sand; thin bedding planes along strata; very friable; few very fine roots; common fine distinct yellowish

brown (10YR 5/4) iron masses with diffuse boundaries throughout the matrix; 15 percent rock fragments; strongly effervescent; moderately alkaline; gradual smooth boundary.

C5—53 to 80 inches; stratified, brown (10YR 5/3) and very dark grayish brown (10YR 3/2) fine sand, gravelly sand, loamy fine sand, and loam; single grain; loose; 1 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 0 to 10 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam, loam, or sandy loam

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 to 7
Chroma—1 to 8
Texture—stratified silt loam, loam, sandy loam, loamy sand, or sand

Rodman Series

Depth class: Very deep
Drainage class: Excessively well drained
Permeability: Moderately rapid in the upper part and very rapid in the lower part
Landform: Breaks on terraces and flood plains
Parent material: Outwash
Slope range: 20 to 70 percent

Taxonomic classification: Sandy-skeletal, mixed, mesic Typic Hapludolls

Typical Pedon

Rodman gravelly sandy loam, 20 to 70 percent slopes, 4,140 feet east and 360 feet south of the northwest corner of sec. 10, T. 13 N., R. 10 E.

A—0 to 7 inches; black (10YR 2/1) gravelly sandy loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many very fine and fine roots; 20 percent gravel and 5 percent cobbles; very slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—7 to 13 inches; dark brown (10YR 3/3) gravelly sandy loam; weak fine granular structure; very friable; many very fine and fine roots; 25 percent gravel and 5 percent cobbles; slightly effervescent; slightly alkaline; clear smooth boundary.

C1—13 to 18 inches; brown (10YR 4/3) very gravelly coarse sand; single grain; loose; few very fine and coarse roots; 55 percent gravel and 10 percent cobbles; strongly effervescent; moderately alkaline; gradual smooth boundary.

C2—18 to 80 inches; yellowish brown (10YR 5/4) extremely gravelly coarse sand; single grain; loose; 60 percent gravel and 10 percent cobbles; strongly effervescent.

Range in Characteristics

Depth to carbonates: 5 to 15 inches
Thickness of the mollic epipedon: 5 to 9 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—gravelly loam or gravelly sandy loam

Bw horizon:
Hue—10YR or 7.5YR
Value—3 to 5
Chroma—3 or 4
Texture—gravelly sandy loam or gravelly loam

C horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 4
Texture—very gravelly or extremely gravelly coarse sand

Ross Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform position: Flood plains
Parent material: Loamy alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Fine-loamy, mixed, mesic Cumulic Hapludolls

Typical Pedon

Ross silt loam, 0 to 2 percent slopes, occasionally flooded, 740 feet south and 700 feet west of the northeast corner of sec. 24, T. 29 N., R. 2 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak very fine granular

structure; friable; many very fine and fine roots; slightly alkaline; clear smooth boundary.

A1—9 to 25 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; friable; many very fine to coarse roots; very slightly effervescent; slightly alkaline; diffuse wavy boundary.

A2—25 to 36 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure; friable; common very fine to coarse roots; very slightly effervescent; slightly alkaline; gradual wavy boundary.

Bw1—36 to 48 inches; dark brown (10YR 3/3) loam; weak medium subangular blocky structure; friable; common very fine to coarse roots; many discontinuous distinct organic coatings on faces of peds; slightly effervescent; slightly alkaline; gradual wavy boundary.

Bw2—48 to 54 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few fine roots; few fine faint dark grayish brown (10YR 4/2) irregular iron depletions throughout the matrix; slightly effervescent; slightly alkaline; gradual wavy boundary.

Bw3—54 to 66 inches; dark grayish brown (2.5Y 4/2), stratified silt loam to gravelly loamy sand; weak medium prismatic structure; friable; few fine roots; common fine prominent yellowish brown (10YR 5/6) irregular soft iron masses with diffuse boundaries throughout the matrix; 10 percent rock fragments; strongly effervescent; slightly alkaline; gradual wavy boundary.

C—66 to 70 inches; dark grayish brown (2.5Y 4/2) gravelly loamy sand; single grain; loose; few fine roots; 60 percent rock fragments; strongly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 40 inches; average of 27 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam, loam, or sandy loam

Bw horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 4
Texture—loam or silt loam

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silt loam, loam, sandy loam, loamy sand, sand, or gravel

Rozetta Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform position: Side slopes on till plains
Parent material: Loess
Slope range: 2 to 10 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Taxadjunct features: Rozetta silt loam, 2 to 5 percent slopes, and Rozetta silt loam, 2 to 5 percent slopes, eroded, have a water table closer to the surface than is defined as the range for the series.

Typical Pedon

Rozetta silt loam, 2 to 5 percent slopes, 1,520 feet south and 600 feet east of the northwest corner of sec. 32, T. 12 N., R. 9 E.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many very fine roots; slightly acid; clear smooth boundary.

BE—7 to 10 inches; brown (10YR 4/3) silt loam; weak medium platy structure parting to moderate very fine subangular blocky; friable; many very fine roots; common distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

Bt1—10 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; common distinct brown (10YR 4/3) clay films and common distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

Bt2—18 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt3—28 to 39 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine distinct light

brownish gray (10YR 6/2) iron depletions throughout the matrix; strongly acid; gradual smooth boundary.

Bt4—39 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium and coarse subangular blocky structure; friable; few very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and common fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine distinct light brownish gray (10YR 6/2) iron depletions throughout the matrix; moderately acid; gradual smooth boundary.

BC—48 to 57 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse subangular blocky structure; friable; few very fine roots; common fine and medium distinct yellowish brown (10YR 5/6) iron masses with diffuse boundaries and few fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine distinct light brownish gray (10YR 6/2) iron depletions throughout the matrix; moderately acid; gradual smooth boundary.

C—57 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; common fine faint dark yellowish brown (10YR 4/4) iron masses with diffuse boundaries and few fine rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine distinct light brownish gray (10YR 6/2) iron depletions throughout the matrix; slightly acid.

Range in Characteristics

Depth to carbonates: 40 to more than 60 inches

Ap horizon:

Hue—10YR
Value—3 to 5
Chroma—1 to 3
Texture—silt loam

E horizon (if it occurs):

Hue—10YR
Value—4 to 6
Chroma—2 or 3
Texture—silt loam

Bt and BC horizons:

Hue—7.5YR, 10YR, or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silt loam or silty clay loam

C horizon:

Hue—10YR
Value—5 or 6
Chroma—2 to 6
Texture—silt loam

Rutland Series

Depth class: Moderately deep to silty clay till
Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Landform position: Nearly level summits and side slopes on till plains
Parent material: Loess over glacial till
Slope range: 0 to 5 percent

Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls
Taxadjunct features: Rutland silty clay loam, 2 to 5 percent slopes, eroded, does not have a mollic epipedon, which is definitive for the series. This soil is classified as a fine, smectitic, mesic Aquertic Hapludalf.

Typical Pedon

Rutland silt loam, 0 to 2 percent slopes, 970 feet south and 480 feet west of the northeast corner of sec. 36, T. 29 N., R. 1 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak very fine and fine granular structure; friable; common very fine and fine roots; neutral; clear smooth boundary.

A—9 to 14 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine and fine granular structure; friable; common very fine and fine roots; slightly acid; clear smooth boundary.

Btg1—14 to 21 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; many continuous distinct dark brown (10YR 3/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and few fine prominent black (10YR 2/1) iron-manganese concretions with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Btg2—21 to 29 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common very fine and fine roots; many continuous prominent dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded

iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) iron-manganese concretions with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.

Btg3—29 to 37 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine and medium prominent black (10YR 2/1) iron-manganese concretions with diffuse boundaries throughout the matrix; few fine distinct light brownish gray (2.5Y 6/2) iron depletions throughout the matrix and lining pores; slightly alkaline; gradual smooth boundary.

Btg4—37 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure; friable; few very fine roots; few discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine and medium prominent yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine and medium prominent iron-manganese concretions with diffuse boundaries throughout the matrix; few fine faint light brownish gray (2.5Y 6/2) iron depletions throughout the matrix and lining pores; 2 percent rock fragments; slightly alkaline; gradual wavy boundary.

2BCkg—42 to 52 inches; grayish brown (2.5Y 5/2) silty clay; weak coarse prismatic structure; firm; few very fine and fine roots; common fine and medium prominent yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine and medium light gray (10YR 7/1) irregular carbonate nodules and few fine and medium black (10YR 2/1) rounded iron-manganese concretions with diffuse boundaries throughout the matrix; common fine prominent light gray (10YR 6/1) iron depletions throughout the matrix and lining pores; 3 percent rock fragments; slightly effervescent; moderately alkaline; gradual wavy boundary.

2Cg—52 to 80 inches; grayish brown (2.5Y 5/2) silty clay; massive; firm; common fine prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and few fine light gray (10YR 7/1) irregular carbonate nodules throughout the matrix; many fine and medium prominent light gray (10YR 6/1) iron depletions throughout the matrix; 3 percent rock fragments; slightly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 25 to 58 inches
Thickness of the mollic epipedon: 7 to 18 inches
Thickness of the loess: 35 to 55 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam, silt loam, or silty clay

2BCkg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay or silty clay loam

2Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay or clay

Sabina Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform position: Nearly level summits on till plains
Parent material: Loess over glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Fine, smectitic, mesic Vertic Epiaqualfs

Typical Pedon

Sabina silt loam, 0 to 2 percent slopes, 1,200 feet west and 2,580 feet north of the southeast corner of sec. 9, T. 30 N., R. 1 W.

Ap—0 to 8 inches; mixed, 90 percent dark grayish brown (10YR 4/2) and 10 percent grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; common very fine roots; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with clear boundaries throughout the matrix; neutral; abrupt smooth boundary.

E—8 to 11 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; weak medium platy

structure parting to moderate very fine subangular blocky; friable; few very fine roots; many distinct white (10YR 8/1 dry) silt coatings on faces of peds; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.

Bt—11 to 15 inches; brown (10YR 5/3) silty clay loam; moderate very fine subangular blocky structure; friable; few very fine roots; few discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine faint yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Btg1—15 to 21 inches; grayish brown (10YR 5/2) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common continuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine distinct yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.

Btg2—21 to 32 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; many continuous distinct dark grayish brown (10YR 4/2) and few discontinuous distinct very dark grayish brown (10YR 3/3) clay films on faces of peds; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine and medium prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; common fine faint light gray (10YR 6/1) iron depletions throughout the matrix; neutral; clear smooth boundary.

Btg3—32 to 43 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many discontinuous distinct dark grayish brown (10YR 4/2) and few discontinuous distinct very dark grayish brown (10YR 3/3) clay films on faces of peds; many fine and medium distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; common fine faint light gray (10YR 6/1) iron depletions throughout the matrix; neutral; gradual smooth boundary.

Btg4—43 to 52 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to weak coarse subangular blocky; firm; few distinct discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; many fine and medium distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; many fine and medium faint light gray (10YR 6/1) iron depletions throughout the matrix; neutral; gradual wavy boundary.

2BCk—52 to 80 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure; firm; many fine and medium distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; common fine prominent light gray (10YR 7/1) rounded soft masses of carbonates throughout the matrix; many fine and medium distinct light gray (5Y 6/1) iron depletions throughout the matrix; about 10 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 35 to 55 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—1 to 3
Texture—silt loam

Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam, silty clay, or silt loam

2BCk horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—clay loam, silty clay loam, or loam

2C horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—loam, clay loam, silt loam, or silty clay loam

Sable Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform position: Nearly level summits on till plains
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Endoaquolls

Typical Pedon

Sable silty clay loam, 0 to 2 percent slopes, 2,424 feet north and 81 feet west of the southeast corner of sec. 1, T. 29 N., R. 2 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many very fine and fine roots; slightly acid; abrupt smooth boundary.

A1—8 to 11 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; many very fine and fine roots; neutral; clear smooth boundary.

A2—11 to 14 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; many very fine and fine roots; common fine distinct dark grayish brown (10YR 4/2) iron depletions throughout the matrix; neutral; clear smooth boundary.

Bg—14 to 20 inches; dark gray (10YR 4/1) silty clay loam; moderate fine and very fine subangular blocky structure; friable; common very fine and fine roots; common fine distinct brown (10YR 5/3) rounded iron masses with diffuse boundaries and few fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.

Btg1—20 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; firm; common very fine roots; common discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; few fine distinct brown (10YR 5/3) rounded iron masses with diffuse boundaries and few fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; gradual smooth boundary.

Btg2—31 to 50 inches; gray (5Y 5/1) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common very fine roots; common discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; many fine and medium prominent brown (10YR 5/3) and common fine and medium prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and common fine and medium prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; gradual smooth boundary.

BC—50 to 69 inches; gray (5Y 5/1) silt loam weak; medium prismatic structure; firm; few very fine roots; many fine and medium prominent yellowish brown (10YR 5/4) and common fine prominent yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries and few fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; slightly effervescent; slightly alkaline; clear wavy boundary.

2C—69 to 80 inches; olive brown (2.5Y 4/4) silty clay loam; massive; firm; 5 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 35 to more than 60 inches
Thickness of the mollic epipedon: 12 to 24 inches

Ap and A horizons:
Hue—10YR or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam or silt loam

Bg, Btg, and BC horizons:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam or silt loam

Cg horizon (if it occurs):
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silt loam or silty clay loam

Sawmill Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform position: Flood plains
Parent material: Silty alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, mesic Cumulic Endoaquolls

Typical Pedon

Sawmill silty clay loam, 0 to 2 percent slopes, occasionally flooded, 144 feet south and 1,340 feet east of the northwest corner of sec. 31, T. 13 N., R. 9 E.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine subangular blocky structure; friable; many fine and medium roots; neutral; abrupt smooth boundary.

A1—7 to 19 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; common fine and medium roots; neutral; diffuse wavy boundary.

A2—19 to 28 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; friable; common fine and medium roots; neutral; gradual wavy boundary.

A3—28 to 33 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few fine roots; common fine prominent strong brown (7.5YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; neutral; gradual wavy boundary.

Bg1—33 to 52 inches; 60 percent grayish brown (2.5Y 5/2) and 40 percent strong brown (7.5YR 5/6) silty clay loam; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; 2 percent rock fragments; slightly alkaline; gradual wavy boundary.

Bg2—52 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium and coarse prismatic structure; friable; few fine roots; many fine prominent strong brown (7.5YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; 1 percent rock fragments; slightly effervescent with a few calcareous pebbles at a depth of 58 inches; slightly alkaline; gradual wavy boundary.

Cg—60 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; few fine roots; many fine prominent strong brown (7.5YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; 1 percent rock fragments; slightly effervescent at a depth of 61 inches; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam or silt loam

Cg horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam or silt loam

Saybrook Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 2 to 10 percent

Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Argiudolls

Taxadjunct features: The Saybrook soils in this survey area do not have a mollic epipedon, which is definitive for the series. These soils are classified as fine-silty, mixed, mesic Oxyaquic Hapludalfs.

Typical Pedon

Saybrook silty clay loam, 2 to 5 percent slopes, eroded, 680 feet north and 201 feet east of the southwest corner of sec. 32, T. 13 N., R. 8 E.

Ap—0 to 8 inches; 70 percent very dark grayish brown (10YR 3/2) and 30 percent brown (10YR 4/3) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common

very fine and fine roots; moderately acid; abrupt smooth boundary.

Bt1—8 to 12 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine and fine roots; few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—12 to 19 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and very fine subangular blocky structure; friable; common very fine and fine roots; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine faint yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Bt3—19 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine faint yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) rounded iron masses with diffuse boundaries throughout the matrix; slightly acid; clear wavy boundary.

2Bt4—27 to 35 inches; brown (7.5YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; 7 percent rock fragments; neutral; clear wavy boundary.

2BCk—35 to 57 inches; brown (7.5YR 5/4) loam; weak coarse subangular blocky structure; firm; few very fine roots; few discontinuous distinct light gray (10YR 7/1) coatings of calcium carbonate on faces of peds; few fine prominent black (10YR 2/1) irregular carbonate nodules throughout the matrix; 7 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C—57 to 80 inches; brown (7.5YR 5/4) loam; massive; firm; 7 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 60 inches; average near 40 inches

Thickness of the mollic epipedon: 5 to 15 inches; average near 9 inches

Thickness of the loess: 20 to 40 inches

Ap horizon:

Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam

Bt horizon:

Hue—10YR or 2.5Y
Value—3 or 4
Chroma—1 to 4
Texture—silty clay loam or silt loam

2Bt and 2BCk horizons:

Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 8
Texture—loam, clay loam, silty clay loam, or silt loam

2C horizon:

Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—2 to 8
Texture—loam or silt loam

Senachwine Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 10 to 35 percent

Taxonomic classification: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Senachwine silt loam, 15 to 25 percent slopes, 2,322 feet south and 210 feet east of the northwest corner of sec. 7, T. 29 N., R. 2 W.

A—0 to 4 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; moderate very fine granular structure; friable; many very fine and fine roots; slightly acid; clear smooth boundary.

E—4 to 11 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium platy structure parting to moderate fine subangular blocky; friable; many very fine and fine roots; slightly acid; clear smooth boundary.

2Bt1—11 to 20 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; firm; many very fine and fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; 3 percent rock fragments; moderately acid; clear smooth boundary.
2Bt2—20 to 28 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine and medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; 3 percent rock fragments; slightly acid; clear smooth boundary.
2Bt3—28 to 44 inches; yellowish brown (10YR 5/4) clay loam; weak medium and coarse prismatic structure; firm; few very fine roots; common discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent rock fragments; strongly effervescent; slightly alkaline; diffuse wavy boundary.
2C—44 to 80 inches; yellowish brown (10YR 5/4) clay loam; massive; firm; 5 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the loess: 0 to 18 inches

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam, loam, or silty clay loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or loam

2Bt horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or clay loam

2C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—5 or 6
Chroma—3 or 4
Texture—loam, clay loam, silt loam, or silty clay loam

Slacwater Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform position: Flood plains
Parent material: Silty alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, calcareous, mesic Mollic Fluvaquents

Typical Pedon

Slacwater silty clay loam, 0 to 2 percent slopes, frequently flooded, long duration, 500 feet south and 860 feet east of the northwest corner of sec. 23, T. 29 N., R. 3 W.

A—0 to 6 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine granular structure; friable; common fine and medium roots; slightly effervescent; slightly alkaline; clear smooth boundary.
Cg1—6 to 20 inches; very dark gray (10YR 3/1) and dark grayish brown (2.5Y 4/2) silt loam; massive; friable; few fine and medium roots; few fine distinct dark yellowish brown (10YR 4/6) rounded iron masses with clear boundaries throughout the matrix; strongly effervescent; moderately alkaline; gradual wavy boundary.
Cg2—20 to 38 inches; dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1) silty clay loam; massive; friable; few fine roots; common fine distinct dark yellowish brown (10YR 4/6) rounded iron masses with clear boundaries throughout the matrix; slightly effervescent; slightly alkaline; gradual wavy boundary.
Cg3—38 to 60 inches; gray (10YR 5/1) silt loam; massive; friable; many medium distinct yellowish brown (10YR 5/6) rounded iron masses with clear boundaries throughout the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 0 to 10 inches

A horizon:
Hue—10YR
Value—2 to 4
Chroma—1 to 3
Texture—silt loam

C horizon:
Hue—10YR, 2.5Y, or 5Y

Value—3 to 7
Chroma—1 to 6
Texture—stratified loamy sand, sandy loam, loam, sand, silt loam, silty clay loam, and silty clay

Sparta Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform position: Side slopes on terraces
Parent material: Eolian deposits
Slope range: 7 to 15 percent

Taxonomic classification: Sandy, mixed, mesic Entic Hapludolls

Taxadjunct features: The Sparta soils in this survey area do not have a mollic epipedon, which is definitive for the series. These soils are classified as sandy, mixed, mesic Psammentic Hapludalfs.

Typical Pedon

Sparta loamy sand, 7 to 15 percent slopes, eroded, 366 feet north and 528 feet east of the southwest corner of sec. 19, T. 13 N., R. 10 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand, brown (10YR 4/3) dry; weak fine subangular blocky structure; very friable; many very fine and fine roots; moderately acid; clear smooth boundary.

Bw1—9 to 13 inches; brown (7.5YR 4/4) loamy sand; weak fine subangular blocky structure; very friable; common very fine and fine roots; moderately acid; clear wavy boundary.

Bw2—13 to 20 inches; strong brown (7.5YR 4/6) sand; weak fine subangular blocky structure; very friable; few very fine roots; moderately acid; gradual wavy boundary.

Bw3—20 to 36 inches; strong brown (7.5YR 4/6) sand; weak fine and medium subangular blocky structure parting to single grain; very friable or loose; few very fine roots; slightly acid; diffuse wavy boundary.

C—36 to 80 inches; yellowish brown (10YR 5/4) sand; single grain; loose; violently effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 35 to more than 60 inches

Ap horizon:
Hue—10YR
Value—2 to 4
Chroma—2 or 3
Texture—loamy sand or sand

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 6
Chroma—3 to 6
Texture—sand or loamy sand

2C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—sand

St. Charles Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform position: Side slopes on till plains
Parent material: Loess over glacial outwash
Slope range: 2 to 5 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

St. Charles silt loam, 2 to 5 percent slopes, 50 feet east and 1,600 feet south of the northwest corner of sec. 7, T. 11 N., R. 5 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common very fine roots; few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; abrupt smooth boundary.

E—7 to 12 inches; brown (10YR 4/3) silt loam; weak medium platy structure; friable; few very fine roots; common continuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; moderately acid; abrupt smooth boundary.

BE—12 to 17 inches; brown (10YR 4/3) silty clay loam; moderate fine angular blocky structure; friable; few very fine roots; strongly acid; clear smooth boundary.

Bt1—17 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium angular blocky structure; firm; few fine roots; few continuous prominent brown (10YR 4/3) clay films on faces of peds; few medium prominent black (10YR 2/1) rounded iron-manganese concretions with diffuse

boundaries throughout the matrix; strongly acid; clear smooth boundary.

Bt2—26 to 37 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and coarse angular blocky structure; firm; few fine roots; common continuous prominent brown (10YR 4/3) clay films on faces of peds; few medium faint brown (10YR 5/3) rounded soft iron masses with diffuse boundaries below a depth of 33 inches; few fine prominent black (10YR 2/1) rounded iron-manganese concretions with diffuse boundaries throughout the matrix; strongly acid; gradual smooth boundary.

Bt3—37 to 51 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse angular blocky structure; friable; few fine roots; few discontinuous distinct brown (10YR 4/3) clay films on faces of peds; few discontinuous distinct white (10YR 8/1) silt coatings on faces of peds; few fine prominent black (10YR 2/1) rounded iron-manganese concretions with diffuse boundaries throughout the matrix; strongly acid; abrupt smooth boundary.

2BC—51 to 60 inches; yellowish brown (10YR 5/4) loam; weak coarse angular blocky structure; friable; few discontinuous distinct brown (10YR 4/3) clay films on faces of peds; moderately acid.

Range in Characteristics

Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam

BE and Bt horizons:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam

2BC horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—loam, silt loam, sandy loam, or clay loam

2C horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, loam, or silt loam

Strawn Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform position: Side slopes on till plains
Parent material: Glacial till
Slope range: 10 to 35 percent

Taxonomic classification: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Strawn silty clay loam, 10 to 15 percent slopes, severely eroded, 1,320 feet south and 480 feet east of the northwest corner of sec. 4, T. 13 N., R. 9 E.

Ap—0 to 6 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common very fine and fine roots; 7 percent gravel; slightly acid; abrupt smooth boundary.

Bt1—6 to 10 inches; brown (7.5YR 4/4) clay loam; moderate very fine and fine subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; 7 percent gravel; neutral; clear smooth boundary.

Bt2—10 to 14 inches; brown (7.5YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; 8 percent gravel; slightly acid; clear smooth boundary.

Bt3—14 to 21 inches; brown (7.5YR 5/4) clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; 8 percent gravel; neutral; clear wavy boundary.

BCk—21 to 45 inches; brown (7.5YR 5/4) loam; weak medium subangular blocky structure; friable; few very fine and fine roots; few discontinuous distinct light gray (10YR 7/1) carbonate coatings on faces of peds; common fine faint strong brown (7.5YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; 8 percent gravel; strongly effervescent; moderately alkaline; gradual wavy boundary.

C—45 to 80 inches; brown (7.5YR 5/4) loam; massive;

friable; many fine and medium faint strong brown (7.5YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; 8 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 14 to 24 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 to 4
Texture—silt loam, clay loam, silty clay loam, or loam

Bt and BCk horizons:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—clay loam, silty clay loam, or loam

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—3 or 4
Texture—loam or clay loam

Streator Series

Depth class: Deep to silty clay till
Drainage class: Poorly drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Landform position: Nearly level summits on till plains
Parent material: Loess over glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Fine, smectitic, mesic Vertic Endoaquolls

Typical Pedon

Streator silty clay loam, 0 to 2 percent slopes, 2,544 feet north and 15 feet west of the southeast corner of sec. 36, T. 29 N., R. 1 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine and medium granular structure; friable; common very fine roots; neutral; clear smooth boundary.

A—9 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common very fine roots; neutral; clear smooth boundary.

BA—13 to 17 inches; dark gray (5Y 4/1) silty clay loam; weak medium prismatic structure parting to moderate fine and very fine subangular blocky; friable; common very fine roots; common fine prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.

Bg—17 to 24 inches; gray (5Y 5/1) silty clay; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; many discontinuous distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and common fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; clear smooth boundary.

Btg1—24 to 33 inches; gray (5Y 5/1) silty clay; weak medium prismatic structure parting to moderate medium subangular blocky structure; friable; common very fine roots; many discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and common fine and medium prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; gradual smooth boundary.

Btg2—33 to 42 inches; gray (5Y 5/1) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; common discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) and brown (10YR 5/3) rounded iron masses with diffuse boundaries and common fine and medium prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; neutral; clear wavy boundary.

2Btg3—42 to 56 inches; grayish brown (2.5Y 5/2) silty clay; weak medium prismatic structure; firm; few very fine roots; few discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) rounded iron masses with diffuse boundaries throughout the matrix; many fine prominent light gray (5Y 6/1) iron depletions lining pores; 5 percent rock fragments; slightly alkaline; gradual wavy boundary.

2BCkg—56 to 68 inches; grayish brown (2.5Y 5/2) silty clay; weak coarse prismatic structure; very firm; few very fine roots; common discontinuous prominent light gray (5Y 7/1) carbonate coatings

on faces of peds and lining root pores; common fine prominent yellowish brown (10YR 5/6) and many fine and medium distinct light olive brown (2.5Y 5/4) rounded iron masses with diffuse boundaries and common fine prominent white (10YR 8/1) irregular carbonate nodules throughout the matrix; many fine prominent light gray (5Y 6/1) iron depletions lining pores; 5 percent rock fragments; slightly effervescent; moderately alkaline; gradual wavy boundary.

2Cg—68 to 80 inches; grayish brown (2.5Y 5/2) silty clay; massive; very firm; common fine and medium prominent light olive brown (2.5Y 5/4) rounded iron masses with diffuse boundaries throughout the matrix; common fine prominent light gray (5Y 6/1) iron depletions throughout the matrix; 5 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 60 inches
Thickness of the mollic epipedon: 12 to 24 inches
Thickness of the loess: 40 to 60 inches

Ap and A horizons:
Hue—10YR
Value—2
Chroma—1
Texture—silty clay loam

Bg and Btg horizons:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam, silty clay, or silt loam

2Btg and 2BCkg horizons:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silty clay or silty clay loam

2Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay

Swygert Series

Depth class: Shallow to silty clay till
Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 2 to 5 percent

Taxonomic classification: Fine, mixed, mesic Aquertic Argiudolls
Taxadjunct features: The Swygert soils in this survey area do not have a mollic epipedon, which is definitive for the series. These soils are classified as fine, mixed, mesic Aquertic Hapludalfs.

Typical Pedon

Swygert silty clay loam, 2 to 5 percent slopes, eroded, 1,740 feet north and 141 feet west of the southeast corner of sec. 3, T. 30 N., R. 1 E.

Ap—0 to 8 inches; 95 percent very dark gray (10YR 3/1) and 5 percent brown (10YR 4/3) silty clay loam, gray (10YR 5/1) dry; moderate very fine and fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 12 inches; brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine roots; few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds and common discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Bt2—12 to 15 inches; brown (10YR 5/3) silty clay; moderate very fine and fine subangular blocky structure; friable; common very fine roots; few discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds and common discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; many fine distinct grayish brown (2.5Y 5/2) iron depletions throughout the matrix; slightly acid; clear wavy boundary.

2Bt3—15 to 23 inches; brown (10YR 5/3) silty clay; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; many discontinuous distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; many fine prominent gray (5Y 5/1) iron depletions throughout the matrix; 2 percent rock fragments; neutral; gradual wavy boundary.

2Btk—23 to 45 inches; brown (10YR 5/3) silty clay; weak medium prismatic structure; very firm; few very fine roots; few discontinuous distinct dark gray (10YR 4/1) clay films on faces of peds; many

fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; few discontinuous prominent white (5Y 8/1) coatings of calcium carbonate on faces of peds; many fine prominent light gray (5Y 6/1) iron depletions throughout the matrix; 2 percent rock fragments; strongly effervescent; moderately alkaline; diffuse wavy boundary.

2C—45 to 80 inches; grayish brown (2.5Y 5/2) silty clay; massive; very firm; common fine prominent yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; many fine prominent light gray (5Y 6/1) iron depletions throughout the matrix; 3 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 35 inches
Thickness of the mollic epipedon: 5 to 10 inches
Thickness of the loess: 5 to 25 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam or silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 4
Texture—silty clay or silty clay loam

2Bt and 2Btk horizons:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay

Sylvan Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Side slopes on till plains
Parent material: Loess
Slope range: 5 to 15 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Taxadjunct features: The Sylvan soils in this survey area have a water table that is closer to the surface than is defined as the range for the series.

Typical Pedon

Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded, 190 feet east and 1,060 feet north of the southwest corner of sec. 26, T. 12 N., R. 8 E.

Ap—0 to 5 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine roots; neutral; clear smooth boundary.

Bt1—5 to 11 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Bt2—11 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine and medium subangular blocky structure; friable; few very fine roots; common continuous distinct brown (10YR 4/3) clay films on faces of peds; many fine distinct yellowish brown (10YR 5/6) and many fine distinct light yellowish brown (2.5Y 6/3) rounded iron masses with diffuse boundaries throughout the matrix; slightly acid; clear smooth boundary.

Bt3—21 to 30 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; few discontinuous distinct brown (10YR 4/3) clay films on faces of peds; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; many fine prominent light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; neutral; clear smooth boundary.

BCk1—30 to 41 inches; yellowish brown (10YR 5/4) silt loam; weak coarse subangular blocky structure; friable; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; common fine and medium white (10YR 8/1) irregular carbonate nodules throughout the matrix; common fine prominent light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; slightly effervescent; moderately alkaline; gradual smooth boundary.

BCk2—41 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; many fine distinct yellowish brown (10YR 5/6) rounded iron masses with diffuse boundaries throughout the matrix; common fine and medium prominent white (10YR 8/1) irregular carbonate nodules throughout the matrix; common fine prominent light brownish gray (2.5Y 6/2) iron depletions throughout the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 22 to 40 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam or silty clay loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

BC and BCk horizons:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

C horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

Varna Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 2 to 10 percent

Taxonomic classification: Fine, illitic, mesic Oxyaquic Argiudolls
Taxadjunct features: The Varna soils in this survey area do not have a mollic epipedon, which is definitive for the series. These soils are classified as fine, illitic, mesic Oxyaquic Hapludalfs.

Typical Pedon

Varna silty clay loam, 5 to 10 percent slopes, eroded, 500 feet north and 1,780 feet east of the southwest corner of sec. 15, T. 29 N., R. 1 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; many very fine roots; moderately acid; abrupt smooth boundary.

Bt1—8 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common very fine roots; many continuous distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; abrupt wavy boundary.

2Bt2—14 to 23 inches; olive brown (2.5Y 4/4) silty clay; moderate fine and medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common very fine roots; many continuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; 5 percent rock fragments; neutral; clear wavy boundary.

2Bt3—23 to 33 inches; olive brown (2.5Y 4/4) silty clay loam; moderate medium prismatic structure; very firm; common very fine roots; many continuous distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; 8 percent rock fragments; strongly effervescent; slightly alkaline; gradual wavy boundary.

2Btk—33 to 43 inches; olive brown (2.5Y 4/4) silty clay loam; weak coarse prismatic structure; very firm; few very fine roots; common discontinuous distinct dark grayish brown (2.5Y 4/2) clay films and few discontinuous prominent light olive gray (5Y 6/2 dry) silt coatings on faces of peds; common fine prominent light olive gray (5Y 6/2) irregular soft masses of carbonates with diffuse boundaries throughout the matrix; 8 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C—43 to 80 inches; olive brown (2.5Y 4/4) silty clay loam; massive; very firm; common fine and medium prominent grayish brown (2.5Y 5/2) irregular iron depletions with diffuse boundaries throughout the matrix; 8 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 50 inches
Thickness of the mollic epipedon: 5 to 12 inches
Thickness of the loess: 6 to 18 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 or 4
Texture—silty clay loam or silt loam

2Bt and 2Btk horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam or silty clay

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam

Wea Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and very rapid in the lower part
Landform position: Nearly level summits and side slopes on outwash plains
Parent material: Glacial outwash
Slope range: 0 to 5 percent

Taxonomic classification: Fine-loamy, mixed, mesic Typic Argiudolls

Typical Pedon

Wea silt loam, 0 to 2 percent slopes, 120 feet south and 756 feet west of the center of sec. 18, T. 13 N., R. 10 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

A1—9 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine and fine roots; slightly acid; clear smooth boundary.

A2—13 to 17 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; common very fine and fine roots; slightly acid; clear smooth boundary.

2Bt1—17 to 29 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; 2 percent rock fragments; slightly acid; clear smooth boundary.

2Bt2—29 to 41 inches; brown (7.5YR 4/4) gravelly loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; 15 percent rock fragments; slightly acid; gradual wavy boundary.

2Bt3—41 to 51 inches; brown (7.5YR 4/4) gravelly coarse sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; many discontinuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; 25 percent rock fragments; neutral; gradual wavy boundary.

3C—51 to 80 inches; yellowish brown (10YR 5/4) gravelly coarse sand; single grain; loose; 25 percent rock fragments; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4
Texture—clay loam, loam, gravelly loam, or gravelly coarse sandy loam

3C horizon:
Hue—10YR
Value—5
Chroma—3 or 4
Texture—gravelly sand or gravelly loamy sand

Wenona Series

Depth class: Moderately deep to silty clay till
Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and very slow in the lower part
Landform position: Side slopes on till plains
Parent material: Loess over glacial till
Slope range: 2 to 10 percent

Taxonomic classification: Fine, smectitic, mesic Vertic Argiudolls
Taxadjunct features: The Wenona soils in this survey area do not have a mollic epipedon, which is

definitive for the series. These soils are classified as fine, smectitic, mesic Vertic Hapludalfs.

Typical Pedon

Wenona silt loam, 2 to 5 percent slopes, eroded, 1,970 feet south and 147 feet west of the northeast corner of sec. 36, T. 29 N., R. 1 E.

Ap—0 to 9 inches; 95 percent very dark brown (10YR 2/2) and 5 percent brown (10YR 4/3) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium granular structure; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

BA—9 to 12 inches; brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—12 to 17 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; many discontinuous distinct dark brown (10YR 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—17 to 30 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common very fine and fine roots; many discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine faint yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; few fine faint light brownish gray (10YR 6/2) irregular iron depletions throughout the matrix; common very fine and fine roots; slightly acid; gradual smooth boundary.

Bt3—30 to 40 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic and moderate medium subangular blocky structure; friable; common very fine and fine roots; common discontinuous distinct brown (10YR 4/3) clay films on faces of peds; common fine and medium faint yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and few fine prominent black (10YR 2/1) rounded iron-manganese nodules with diffuse boundaries throughout the matrix; few fine faint light brownish gray (10YR 6/2) irregular iron depletions throughout the matrix; slightly acid; gradual wavy boundary.

2BCkg—40 to 52 inches; grayish brown (2.5Y 5/2) silty clay; weak medium prismatic structure; firm; few very fine roots; few fine prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries and common fine and medium prominent white (10YR 8/1) carbonate nodules throughout the matrix; few fine distinct light gray (10YR 6/1) irregular iron depletions throughout the matrix; 3 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

2Cg—52 to 80 inches; olive gray (5Y 5/2) silty clay; massive; firm; few fine prominent yellowish brown (10YR 5/4) rounded iron masses with diffuse boundaries throughout the matrix; common fine and medium prominent light gray (10YR 6/1) irregular iron depletions throughout the matrix; 3 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 25 to 55 inches
Thickness of the mollic epipedon: 5 to 12 inches
Thickness of the loess: 35 to 55 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—silt loam, silty clay loam, or silty clay

2BCkg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay or silty clay loam

2Cg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay

Worthen Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform position: Nearly level terraces
Parent material: Silty alluvium
Slope range: 2 to 5 percent

Taxonomic classification: Fine-silty, mixed, mesic Cumulic Hapludolls

Typical Pedon

Worthen silt loam, 2 to 5 percent slopes, 1,590 feet east and 1,440 feet north of the center of sec. 13, T. 14 N., R. 9 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine and medium granular structure; friable; common fine roots; neutral; clear smooth boundary.

A1—8 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; friable; common very fine and fine roots; many continuous distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—13 to 24 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; common very fine and fine roots; common continuous distinct black (10YR 2/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bw1—24 to 34 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine and fine roots; common continuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bw2—34 to 47 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; weak medium prismatic structure parting to weak medium subangular blocky; friable; common very fine and fine roots; common continuous distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

BC—47 to 57 inches; brown (7.5YR 4/4) loam; weak medium prismatic structure; friable; few very fine and fine roots; neutral; clear smooth boundary.

C—57 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

Bw and BC horizons:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 to 4
Texture—silt loam, loam, or silty clay loam

C horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of

exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches

deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—***excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,*** and ***very poorly drained***. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called ***normal field capacity, normal moisture capacity,*** or ***capillary capacity***.

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed

waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually

expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of

organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic

concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—***platy*** (laminated), ***prismatic*** (vertical axis of aggregates longer than horizontal), ***columnar*** (prisms with rounded tops), ***blocky*** (angular or subangular), and ***granular***. ***Structureless*** soils are either ***single grain*** (each grain by itself, as in dune sand) or ***massive*** (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are ***sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,*** and ***clay***. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Lacon, Illinois)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	^oF	^oF	^oF	^oF	^oF	Units	In	In	In		In
January----	31.2	13.3	22.2	59	-19	8	1.51	0.64	2.25	4	6.7
February---	36.2	17.7	26.9	64	-13	21	1.30	.59	1.90	3	5.5
March------	49.3	29.3	39.3	79	3	128	3.05	1.57	4.34	6	2.2
April------	63.8	40.2	52.0	87	19	371	4.04	2.12	5.73	7	.5
May--------	74.5	50.6	62.5	91	30	693	4.20	2.52	5.71	7	.0
June-------	83.5	59.5	71.5	95	42	940	4.27	2.03	6.21	6	.0
July-------	86.8	63.8	75.3	99	47	1,090	4.08	2.11	5.80	6	.0
August-----	85.0	61.7	73.4	98	45	1,016	3.48	1.54	5.15	5	.0
September--	78.5	54.2	66.3	94	33	788	4.13	2.03	6.21	5	.0
October----	66.3	43.1	54.7	87	22	459	2.86	1.15	4.31	5	.1
November---	51.1	32.5	41.8	76	9	147	2.84	1.46	4.06	5	1.4
December---	36.8	20.4	28.6	65	-11	27	2.42	1.17	3.51	5	5.6
Yearly:											
Average---	61.9	40.5	51.2	---	---	---	---	---	---	---	---
Extreme---	103	-24	---	100	-21	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,689	38.20	24.44	44.59	64	22.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Lacon, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 20	May 2	May 8
2 years in 10 later than--	Apr. 13	Apr. 25	May 3
5 years in 10 later than--	Apr. 1	Apr. 14	Apr. 23
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 18	Oct. 3	Sept. 26
2 years in 10 earlier than--	Oct. 23	Oct. 9	Oct. 1
5 years in 10 earlier than--	Nov. 3	Oct. 22	Oct. 11

Table 3.--Growing Season

(Recorded in the period 1961-90 at Lacon, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	190	162	146
8 years in 10	198	172	154
5 years in 10	215	190	170
2 years in 10	231	208	186
1 year in 10	240	218	195

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
17A	Keomah silt loam, 0 to 2 percent slopes	2,829	1.1
17B2	Keomah silt loam, 2 to 5 percent slopes, eroded	320	0.1
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded	192	*
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded	23	*
24C2	Dodge silt loam, 5 to 10 percent slopes, eroded	3,604	1.4
24D2	Dodge silt loam, 10 to 15 percent slopes, eroded	1,520	0.6
25G	Hennepin loam, 35 to 60 percent slopes	11,042	4.3
37B	Worthen silt loam, 2 to 5 percent slopes	77	*
43A	Ipava silt loam, 0 to 2 percent slopes	3,437	1.3
51A	Muscatune silt loam, 0 to 2 percent slopes	12,256	4.8
60C2	La Rose silty clay loam, 5 to 10 percent slopes, eroded	494	0.2
60D2	La Rose silt loam, 10 to 15 percent slopes, eroded	324	0.1
68A	Sable silty clay loam, 0 to 2 percent slopes	17,484	6.9
86B	Osco silt loam, 2 to 5 percent slopes	12,749	5.0
86B2	Osco silty clay loam, 2 to 5 percent slopes, eroded	3,484	1.4
86C2	Osco silty clay loam, 5 to 10 percent slopes, eroded	1,006	0.4
88C2	Sparta loamy sand, 7 to 15 percent slopes, eroded	865	0.3
91B2	Swygert silty clay loam, 2 to 5 percent slopes, eroded	464	0.2
93G	Rodman gravelly sandy loam, 20 to 70 percent slopes	762	0.3
145B2	Saybrook silty clay loam, 2 to 5 percent slopes, eroded	1,211	0.5
145C2	Saybrook silty clay loam, 5 to 10 percent slopes, eroded	5,182	2.0
148B	Proctor silt loam, 2 to 5 percent slopes	240	*
150A	Onarga sandy loam, 0 to 2 percent slopes	518	0.2
150C	Onarga sandy loam, 5 to 10 percent slopes	391	0.2
152A	Drummer silty clay loam, 0 to 2 percent slopes	275	0.1
154A	Flanagan silt loam, 0 to 2 percent slopes	11,932	4.7
171B	Catlin silt loam, 2 to 5 percent slopes	7,275	2.9
171B2	Catlin silt loam, 2 to 5 percent slopes, eroded	3,781	1.5
171C2	Catlin silty clay loam, 5 to 10 percent slopes, eroded	3,335	1.3
194F	Morley silt loam, 25 to 35 percent slopes	16	*
198A	Elburn silt loam, 0 to 2 percent slopes	472	0.2
199A	Plano silt loam, 0 to 2 percent slopes	1,433	0.6
199B	Plano silt loam, 2 to 5 percent slopes	1,148	0.5
223B2	Varna silty clay loam, 2 to 5 percent slopes, eroded	449	0.2
223C2	Varna silty clay loam, 5 to 10 percent slopes, eroded	1,354	0.5
224D3	Strawn silty clay loam, 10 to 15 percent slopes, severely eroded	359	0.1
224E	Strawn silt loam, 15 to 25 percent slopes	158	*
233B	Birkbeck silt loam, 2 to 5 percent slopes	2,330	0.9
233B2	Birkbeck silty clay loam, 2 to 5 percent slopes, eroded	902	0.4
233C2	Birkbeck silty clay loam, 5 to 10 percent slopes, eroded	4,622	1.8
236A	Sabina silt loam, 0 to 2 percent slopes	251	*
243B	St. Charles silt loam, 2 to 5 percent slopes	971	0.4
244A	Hartsburg silty clay loam, 0 to 2 percent slopes	530	0.2
257A	Clarksdale silt loam, 0 to 2 percent slopes	1,023	0.4
279B	Rozetta silt loam, 2 to 5 percent slopes	8,791	3.4
279B2	Rozetta silt loam, 2 to 5 percent slopes, eroded	1,439	0.6
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	2,006	0.8
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	1,880	0.7
280D	Fayette silt loam, 10 to 15 percent slopes	231	*
356A	Elpaso silty clay loam, 0 to 2 percent slopes	3,027	1.2
375A	Rutland silt loam, 0 to 2 percent slopes	12,652	5.0
375B2	Rutland silty clay loam, 2 to 5 percent slopes, eroded	1,005	0.4
379A	Dakota loam, 0 to 2 percent slopes	5,601	2.2
379B	Dakota loam, 2 to 5 percent slopes	2,834	1.1
383B	New Vienna silt loam, 2 to 5 percent slopes	883	0.3
388B2	Wenona silt loam, 2 to 5 percent slopes, eroded	5,031	2.0
399A	Wea silt loam, 0 to 2 percent slopes	1,384	0.5
399B	Wea silt loam, 2 to 5 percent slopes	1,407	0.6
435A	Streator silty clay loam, 0 to 2 percent slopes	6,575	2.6
484A	Harco silt loam, 0 to 2 percent slopes	17,042	6.7

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
536	Dumps, mine	25	*
541B2	Graymont silty clay loam, 2 to 5 percent slopes, eroded	9,388	3.7
541C2	Graymont silty clay loam, 5 to 10 percent slopes, eroded	1,975	0.8
549G	Marseilles silt loam, 35 to 60 percent slopes	466	0.2
567B	Elkhart silt loam, 2 to 5 percent slopes	6,424	2.5
567C2	Elkhart silty clay loam, 5 to 10 percent slopes, eroded	1,503	0.6
570A	Martinsville silt loam, 0 to 2 percent slopes	688	0.3
570C	Martinsville fine sandy loam, 5 to 10 percent slopes	1,101	0.4
614A	Chenoa silt loam, 0 to 2 percent slopes	726	0.3
618D2	Senachwine silt loam, 10 to 15 percent slopes, eroded	2,060	0.8
618E	Senachwine loam, 15 to 25 percent slopes	3,032	1.2
802B	Orthents, loamy, undulating	487	0.2
865	Pits, gravel	515	0.2
883F	Senachwine-Hennepin complex, 25 to 35 percent slopes	1,792	0.7
3028A	Jules silt loam, 0 to 2 percent slopes, frequently flooded	43	*
3360L	Slacwater silty clay loam, 0 to 2 percent slopes, frequently flooded, long duration	2,267	0.9
3480L	Moundprairie silty clay loam, 0 to 2 percent slopes, frequently flooded, long duration	3,352	1.3
7081A	Littleton silt loam, 0 to 2 percent slopes, rarely flooded	278	0.1
7304B	Landes loam, 2 to 5 percent slopes, rarely flooded	8	*
8073A	Ross silt loam, 0 to 2 percent slopes, occasionally flooded	2,650	1.0
8074A	Radford silt loam, 0 to 2 percent slopes, occasionally flooded	5,074	2.0
8107A	Sawmill silty clay loam, 0 to 2 percent slopes, occasionally flooded	6,555	2.6
8304A	Landes fine sandy loam, 0 to 2 percent slopes, occasionally flooded	1,683	0.7
8368A	Raveenwash silt loam, 0 to 2 percent slopes, occasionally flooded	889	0.3
W	Water	7,048	2.8
	Total	254,880	100.0

* Less than 0.1 percent.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
17A------------- Keomah	2w	131	44	---	72	---	8.8
17B2------------ Keomah	2e	124	37	50	69	---	8.3
19C3------------ Sylvan	4e	97	30	46	57	---	7.2
19D3------------ Sylvan	4e	93	29	44	55	---	6.9
24C2------------ Dodge	3e	96	30	---	66	---	---
24D2------------ Dodge	4e	113	37	49	63	---	---
25G------------- Hennepin	7e	---	---	---	---	---	2.1
37B------------- Worthen	2e	149	46	61	87	5.8	9.7
43A------------- Ipava	1	163	52	66	91	---	---
51A------------- Muscatune	1	170	57	---	102	---	11.4
60C2------------ La Rose	3e	112	37	47	67	4.5	7.5
60D2------------ La Rose	4e	106	35	45	64	4.3	7.2
68A------------- Sable	2w	156	51	61	85	---	---
86B------------- Osco	2e	153	46	61	88	---	9.7
86B2------------ Osco	2e	150	45	60	86	---	8.5
86C2------------ Osco	3e	146	43	58	84	---	9.2
88C2------------ Sparta	6s	---	---	32	42	---	---
91B2------------ Swygert	2e	107	37	48	69	4.2	7.1

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
93G------------- Rodman	7s	---	---	---	---	---	---
145B2------------ Saybrook	2e	133	44	58	81	5.4	8.9
145C2------------ Saybrook	3e	131	43	56	79	5.3	8.7
148B------------- Proctor	2e	143	44	58	87	5.4	9.1
150A------------- Onarga	2s	110	36	48	74	---	7.0
150C------------- Onarga	3e	107	35	46	72	---	6.8
152A------------- Drummer	2w	154	51	61	83	---	9.2
154A------------- Flanagan	1	162	52	67	92	6.1	10.2
171B------------- Catlin	2e	149	46	60	86	5.7	9.6
171B2------------ Catlin	2e	144	44	59	84	5.6	9.3
171C2------------ Catlin	3e	141	43	57	82	5.5	9.1
194F------------- Morley	6e	---	---	---	---	---	---
198A------------- Elburn	1	161	50	63	94	6.1	10.2
199A------------- Plano	1	151	45	60	90	---	9.7
199B------------- Plano	2e	150	45	59	89	---	9.6
223B2------------ Varna	2e	116	39	50	70	4.7	7.8
223C2------------ Varna	3e	112	37	39	54	4.5	7.5
224D3------------ Strawn	4e	77	23	31	42	3.3	5.6
224E------------- Strawn	6e	---	---	---	---	3.0	5.0
233B------------- Birkbeck	2e	122	41	54	69	4.9	8.2

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
233B2------------ Birkbeck	2e	118	39	53	67	4.8	8.0
233C2------------ Birkbeck	3e	116	39	52	66	4.7	7.8
236A------------- Sabina	2w	133	42	56	75	5.2	8.7
243B------------- St. Charles	2e	126	39	55	72	---	8.1
244A------------- Hartsburg	2w	145	47	56	79	---	---
257A------------- Clarksdale	1	140	43	57	79	---	---
279B------------- Rozetta	2e	130	40	53	72	5.1	8.6
279B2------------ Rozetta	2e	129	40	53	72	5.1	8.5
279C2------------ Rozetta	3e	123	38	51	69	4.9	8.2
280C2------------ Fayette	3e	121	37	50	69	---	9.8
280D------------- Fayette	3e	119	36	49	67	4.8	8.1
356A------------- Elpaso	2w	146	49	58	82	---	---
375A------------- Rutland	2w	132	45	59	84	5.3	8.8
375B2------------ Rutland	2e	131	45	58	83	5.2	8.7
379A------------- Dakota	2s	107	36	51	67	---	---
379B------------- Dakota	2e	106	35	50	66	---	---
383B------------- New Vienna	2e	147	49	---	88	---	10.3
388B2------------ Wenona	2e	119	40	53	76	5.0	8.4
399A------------- Wea	2s	120	42	48	---	4.0	---
399B------------- Wea	2e	120	42	48	---	4.0	---

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
435A------------- Streator	2w	129	45	54	77	---	---
484A------------- Harco	1	154	47	62	87	5.6	9.3
536. Dumps, mine							
541B2------------ Graymont	2e	138	46	59	83	5.5	9.2
541C2------------ Graymont	3e	130	43	55	78	5.3	8.7
549G------------- Marseilles	7e	---	---	---	---	---	---
567B------------- Elkhart	2e	131	39	52	72	5.0	8.4
567C2------------ Elkhart	3e	123	37	49	68	4.7	7.9
570A------------- Martinsville	1	121	37	51	66	4.0	---
570C------------- Martinsville	3e	117	36	39	64	3.3	---
614A------------- Chenoa	2w	135	45	61	85	---	9.3
618D2------------ Senachwine	4e	80	28	36	---	2.6	---
618E------------- Senachwine	6e	---	---	---	---	---	---
802B. Orthents							
865. Pits, gravel							
883F-------------		---	---	---	---	---	---
Senachwine------	6e						
Hennepin--------	7e						
3028A------------ Jules	2w	65	20	---	36	3.3	5.6
3360L------------ Slacwater	5w	---	---	---	---	---	---
3480L------------ Moundprairie	5w	---	---	---	---	---	---

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
7081A------------ Littleton	1	159	50	63	90	---	---
7304B------------ Landes	2e	98	34	45	61	---	6.1
8073A------------ Ross	2w	109	35	45	60	---	---
8074A------------ Radford	2w	114	37	49	67	---	7.4
8107A------------ Sawmill	2w	110	35	40	57	---	---
8304A------------ Landes	2s	74	26	34	46	---	6.2
8368A------------ Raveenwash	2w	70	22	30	42	---	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Table 6.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
17A	Keomah silt loam, 0 to 2 percent slopes (where drained)
17B2	Keomah silt loam, 2 to 5 percent slopes, eroded
37B	Worthen silt loam, 2 to 5 percent slopes
43A	Ipava silt loam, 0 to 2 percent slopes
51A	Muscatune silt loam, 0 to 2 percent slopes
68A	Sable silty clay loam, 0 to 2 percent slopes (where drained)
86B	Osco silt loam, 2 to 5 percent slopes
86B2	Osco silty clay loam, 2 to 5 percent slopes, eroded
91B2	Swygert silty clay loam, 2 to 5 percent slopes, eroded
145B2	Saybrook silty clay loam, 2 to 5 percent slopes, eroded
148B	Proctor silt loam, 2 to 5 percent slopes
150A	Onarga sandy loam, 0 to 2 percent slopes
152A	Drummer silty clay loam, 0 to 2 percent slopes (where drained)
154A	Flanagan silt loam, 0 to 2 percent slopes
171B	Catlin silt loam, 2 to 5 percent slopes
171B2	Catlin silt loam, 2 to 5 percent slopes, eroded
198A	Elburn silt loam, 0 to 2 percent slopes
199A	Plano silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
223B2	Varna silty clay loam, 2 to 5 percent slopes, eroded
233B	Birkbeck silt loam, 2 to 5 percent slopes
233B2	Birkbeck silty clay loam, 2 to 5 percent slopes, eroded
236A	Sabina silt loam, 0 to 2 percent slopes (where drained)
243B	St. Charles silt loam, 2 to 5 percent slopes
244A	Hartsburg silty clay loam, 0 to 2 percent slopes (where drained)
257A	Clarksdale silt loam, 0 to 2 percent slopes (where drained)
279B	Rozetta silt loam, 2 to 5 percent slopes
279B2	Rozetta silt loam, 2 to 5 percent slopes, eroded
356A	Elpaso silty clay loam, 0 to 2 percent slopes (where drained)
375A	Rutland silt loam, 0 to 2 percent slopes
375B2	Rutland silty clay loam, 2 to 5 percent slopes, eroded
379A	Dakota loam, 0 to 2 percent slopes
379B	Dakota loam, 2 to 5 percent slopes
383B	New Vienna silt loam, 2 to 5 percent slopes
388B2	Wenona silt loam, 2 to 5 percent slopes, eroded
399A	Wea silt loam, 0 to 2 percent slopes
399B	Wea silt loam, 2 to 5 percent slopes
435A	Streator silty clay loam, 0 to 2 percent slopes (where drained)
484A	Harco silt loam, 0 to 2 percent slopes
541B2	Graymont silty clay loam, 2 to 5 percent slopes, eroded
567B	Elkhart silt loam, 2 to 5 percent slopes
570A	Martinsville silt loam, 0 to 2 percent slopes
614A	Chenoa silt loam, 0 to 2 percent slopes
3028A	Jules silt loam, 0 to 2 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
7081A	Littleton silt loam, 0 to 2 percent slopes, rarely flooded
7304B	Landes loam, 2 to 5 percent slopes, rarely flooded
8073A	Ross silt loam, 0 to 2 percent slopes, occasionally flooded
8074A	Radford silt loam, 0 to 2 percent slopes, occasionally flooded
8107A	Sawmill silty clay loam, 0 to 2 percent slopes, occasionally flooded (where drained)
8304A	Landes fine sandy loam, 0 to 2 percent slopes, occasionally flooded
8368A	Raveenwash silt loam, 0 to 2 percent slopes, occasionally flooded

Table 7.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed)

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
17A:										
Keomah----------	3A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	4	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, white oak.
							White oak-----------	65	3	
17B2:										
Keomah----------	3A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	4	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, white oak.
							White oak-----------	65	3	
19C3:										
Sylvan----------	6A	Slight	Slight	Slight	Slight	Moderate	Black walnut--------	---	---	Black walnut, eastern white pine, green ash, northern red oak, sugar maple, white oak.
							Northern red oak----	80	4	
							Tuliptree-----------	90	6	
							White oak-----------	80	4	
19D3:										
Sylvan----------	6A	Slight	Slight	Slight	Slight	Moderate	Black walnut--------	---	---	Black walnut, eastern white pine, green ash, northern red oak, sugar maple, white oak.
							Northern red oak----	80	4	
							Tuliptree-----------	90	6	
							White oak-----------	80	4	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
24C2:										
Dodge-----------	4A	Slight	Slight	Slight	Slight	Severe	Black cherry--------	---	---	Black walnut, eastern white pine, northern red oak.
							Northern red oak----	75	4	
							White oak-----------	---	---	
24D2:										
Dodge-----------	4A	Slight	Slight	Slight	Slight	Severe	Black cherry--------	---	---	Black walnut, eastern white pine, northern red oak.
							Northern red oak----	75	4	
							White oak-----------	---	---	
25G:										
Hennepin--------	5R	Severe	Severe	Slight	Slight	Moderate	Black walnut--------	---	---	Black walnut, eastern redcedar, eastern white pine, northern red oak, white oak.
							Northern red oak----	85	5	
							White oak-----------	---	---	
88C2:										
Sparta----------	4S	Slight	Slight	Severe	Slight	Slight	Black oak-----------	70	4	Black oak, eastern redcedar, eastern white pine.
							Eastern white pine--	---	---	
93G:										
Rodman----------	4R	Severe	Severe	Severe	Slight	Slight	Eastern white pine--	85	14	Eastern redcedar, eastern white pine, green ash, red pine.
							Northern red oak----	70	4	
							Red pine------------	75	10	
							White oak-----------	70	4	
194F:										
Morley----------	4R	Moderate	Moderate	Slight	Slight	Moderate	Black walnut--------	---	---	Black walnut, eastern white pine, northern red oak, white oak.
							Bur oak-------------	---	---	
							Northern red oak----	80	4	
							Shagbark hickory----	---	---	
							White oak-----------	80	4	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
224D3:										
Strawn	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut	---	---	Black walnut, eastern white pine, northern red oak, white oak.
							Northern red oak	80	4	
							Shagbark hickory	---	---	
							White oak	80	4	
224E:										
Strawn	4R	Moderate	Moderate	Moderate	Slight	Moderate	Black walnut	---	---	Black walnut, eastern white pine, northern red oak, white ash, white oak.
							Northern red oak	80	4	
							Shagbark hickory	---	---	
							White oak	80	4	
233B:										
Birkbeck	5A	Slight	Slight	Slight	Slight	Moderate	Northern red oak	---	---	Black walnut, eastern white pine, northern red oak, white ash, white oak.
							White ash	---	---	
							White oak	86	5	
233B2:										
Birkbeck	5A	Slight	Slight	Slight	Slight	Moderate	Northern red oak	---	---	Black walnut, eastern white pine, northern red oak, white ash, white oak.
							White ash	---	---	
							White oak	86	5	
233C2:										
Birkbeck	5A	Slight	Slight	Slight	Slight	Moderate	Northern red oak	---	---	Black walnut, eastern white pine, northern red oak, white ash, white oak.
							White ash	---	---	
							White oak	86	5	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
236A:										
Sabina----------	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut--------	---	---	American sycamore, black walnut, bur oak, eastern cottonwood, eastern redcedar, eastern white pine, green ash, northern red oak, white oak.
							Northern red oak----	80	4	
							White oak-----------	80	4	
243B:										
St. Charles-----	7A	Slight	Slight	Slight	Slight	Severe	Green ash-----------	---	---	Black walnut, eastern white pine, sugar maple, white oak.
							Northern red oak----	85	5	
							White oak-----------	85	5	
257A:										
Clarksdale------	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut--------	---	---	American sycamore, black walnut, eastern white pine, green ash, northern red oak.
							Northern red oak----	80	4	
							White oak-----------	80	4	
279B:										
Rozetta---------	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut--------	---	---	Basswood, eastern white pine, northern red oak, white ash, white oak.
							Northern red oak----	80	4	
							White ash-----------	---	---	
							White oak-----------	80	4	
279B2:										
Rozetta---------	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut--------	---	---	Basswood, bur oak, eastern white pine, northern red oak, white ash, white oak.
							Northern red oak----	80	4	
							White ash-----------	---	---	
							White oak-----------	80	4	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
279C2:										
Rozetta	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut	---	---	Basswood, bur oak, eastern white pine, northern red oak, white ash, white oak.
							Northern red oak	80	4	
							White ash	---	---	
							White oak	80	4	
280C2:										
Fayette	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut	---	---	Eastern white pine, northern red oak, white ash.
							Northern red oak	80	4	
							White ash	---	---	
							White oak	80	4	
280D:										
Fayette	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut	---	---	Eastern white pine, northern red oak, white ash, white oak.
							Northern red oak	80	4	
							White oak	80	4	
383B:										
New Vienna	4A	Slight	Slight	Slight	Slight	Moderate	Black walnut	---	---	Bur oak, eastern white pine, green ash, northern red oak.
							Northern red oak	80	4	
							White oak	80	4	
549G:										
Marseilles	3R	Severe	Severe	Slight	Slight	Moderate	Black oak	---	---	Black oak, black walnut, eastern white pine, northern red oak, white oak.
							Northern red oak	66	3	
							White ash	---	---	
							White oak	66	3	
570A:										
Martinsville	4A	Slight	Slight	Slight	Slight	Severe	Black oak	---	---	Black cherry, black walnut, eastern white pine, northern red oak, white ash, white oak.
							Shagbark hickory	---	---	
							White oak	80	4	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
570C:										
Martinsville	4A	Slight	Slight	Slight	Slight	Severe	Black oak	---	---	Black cherry, black walnut, eastern white pine, northern red oak, white ash, white oak.
							Shagbark hickory	---	---	
							White oak	80	4	
618D2:										
Senachwine	5A	Slight	Slight	Slight	Slight	Moderate	Black walnut	---	---	Black walnut, eastern white pine, white ash, white oak.
							Northern red oak	---	---	
							Sweetgum	76	5	
							White oak	90	5	
618E:										
Senachwine	5R	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	---	---	Black walnut, eastern white pine, red pine, white ash, white oak.
							White oak	90	5	
883F:										
Senachwine	5R	Moderate	Moderate	Slight	Slight	Moderate	Shagbark hickory	---	---	Black walnut, eastern white pine, northern red oak, white ash, white oak.
							White oak	90	5	
Hennepin	5R	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	85	5	Black walnut, eastern redcedar, eastern white pine, northern red oak, white ash, white oak.
							Shagbark hickory	---	---	
							White oak	---	---	
3028A:										
Jules	4A	Slight	Slight	Moderate	Slight	Moderate	Black cherry	---	---	Black walnut, bur oak, eastern cottonwood, eastern white pine, green ash.
							Bur oak	80	4	
							Eastern cottonwood	---	---	
							Silver maple	---	---	
							Sugar maple	---	---	
							Swamp white oak	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
3360L:										
Slacwater	11W	Slight	Severe	Severe	Severe	Severe	Black willow	---	---	American sycamore, bur oak, common hackberry, eastern cottonwood, pin oak, silver maple, swamp white oak.
							Eastern cottonwood	110	11	
							Silver maple	---	---	
3480L:										
Moundprairie	2W	Slight	Severe	Slight	Slight	Severe	Eastern cottonwood	86	6	Eastern cottonwood, green ash, silver maple, swamp white oak.
							Green ash	50	2	
7304B:										
Landes	7A	Slight	Slight	Slight	Slight	Severe	American sycamore	---	---	American sycamore, black walnut, bur oak, eastern cottonwood, eastern redcedar, eastern white pine, green ash.
							Eastern cottonwood	105	10	
							Green ash	---	---	
8073A:										
Ross	5A	Slight	Slight	Slight	Slight	Moderate	Black cherry	---	---	Norway spruce, black walnut, eastern white pine, green ash.
							Black walnut	---	---	
							Green ash	---	---	
							Northern red oak	86	5	
							White oak	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
8107A:										
Sawmill	5W	Slight	Moderate	Moderate	Moderate	Severe	American sycamore	---	---	American sycamore, bur oak, common hackberry, eastern cottonwood, green ash, silver maple, swamp white oak.
							Bur oak	---	---	
							Eastern cottonwood	---	---	
							Swamp white oak	---	---	
8304A:										
Landes	7A	Slight	Slight	Slight	Slight	Severe	American sycamore	---	---	American sycamore, black walnut, eastern cottonwood, green ash, silver maple.
							Bur oak	---	---	
							Eastern cottonwood	105	10	
							Green ash	---	---	
8368A:										
Raveenwash	11W	Slight	Slight	Moderate	Slight	Moderate	Eastern cottonwood	110	11	American sycamore, European larch, baldcypress, common hackberry, eastern cottonwood, green ash, silver maple, swamp white oak, sweetgum.

* Volume of wood fiber is the yield in cubic meters per hectare per year calculated at the age of culmination of the mean annual increment for fully stocked natural stands.

Table 8.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
17A:					
Keomah	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
17B2:					
Keomah	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
19C3:					
Sylvan	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
19D3:					
Sylvan	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
24C2:					
Dodge	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
24D2:					
Dodge	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
25G:					
Hennepin	Siberian peashrub, silky dogwood, gray dogwood.	Washington hawthorn, eastern redcedar, osageorange.	Northern catalpa, honeylocust.	---	---
37B:					
Worthen	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
43A:					
Ipava-----------	Silky dogwood-----	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce-----	Eastern white pine, pin oak.
51A:					
Muscatune-------	Silky dogwood-----	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce-----	Eastern white pine, pin oak.
60C2:					
La Rose---------	Silky dogwood-----	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce-----	Eastern white pine, pin oak.
60D2:					
La Rose---------	Silky dogwood-----	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce-----	Eastern white pine, pin oak.
68A:					
Sable-----------	Silky dogwood-----	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, eastern white pine.	Pin oak.
86B:					
Osco------------	Silky dogwood-----	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce-----	Eastern white pine, pin oak.
86B2:					
Osco------------	Silky dogwood-----	---	White fir, Washington hawthorn, northern whitecedar.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
86C2.					
Osco					
88C2:					
Sparta----------	Siberian peashrub, common lilac.	Washington hawthorn.	Eastern redcedar	Eastern white pine	---
91B2:					
Swygert---------	---	Southern arrowwood.	Washington hawthorn, green ash, eastern redcedar, osageorange.	Pin oak-----------	---

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
93G: Rodman	Siberian peashrub, silky dogwood, gray dogwood.	Washington hawthorn, eastern redcedar.	---	---	---
145B2: Saybrook	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
145C2: Saybrook	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
148B: Proctor	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
150A: Onarga	---	---	Washington hawthorn, eastern redcedar, osageorange, northern whitecedar.	Norway spruce	Eastern white pine.
150C: Onarga	---	---	Washington hawthorn, eastern redcedar, osageorange, northern whitecedar.	Norway spruce	Eastern white pine.
152A: Drummer	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, eastern white pine.	Pin oak.
154A: Flanagan	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
171B: Catlin	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
171B2:					
Catlin	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
171C2:					
Catlin	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
194F:					
Morley	Silky dogwood	Southern arrowwood.	Washington hawthorn, green ash, eastern redcedar, osageorange.	Eastern white pine, pin oak.	---
198A:					
Elburn	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
199A:					
Plano	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
199B:					
Plano	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
223B2:					
Varna	Silky dogwood	Southern arrowwood.	Washington hawthorn, green ash, eastern redcedar, osageorange.	Eastern white pine, pin oak.	---
223C2:					
Varna	Silky dogwood	Southern arrowwood.	Washington hawthorn, green ash, eastern redcedar, osageorange.	Eastern white pine, pin oak.	---
224D3:					
Strawn	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
224E. Strawn					
233B: Birkbeck	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
233B2: Birkbeck	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
233C2: Birkbeck	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
236A: Sabina	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
243B: St. Charles	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
244A: Hartsburg	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, eastern white pine.	Pin oak.
257A: Clarksdale	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
279B: Rozetta	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
279B2:					
Rozetta	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
279C2:					
Rozetta	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
280C2:					
Fayette	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
280D:					
Fayette	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
356A:					
Elpaso	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, eastern white pine.	Pin oak.
375A:					
Rutland	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
375B2:					
Rutland	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
379A:					
Dakota	Common lilac	Washington hawthorn, eastern redcedar.	Eastern white pine	---	---
379B:					
Dakota	Common lilac	Washington hawthorn, eastern redcedar.	Eastern white pine	---	---

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
383B:					
New Vienna	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
388B2:					
Wenona	---	Gray dogwood, southern arrowwood.	Washington hawthorn, green ash, eastern redcedar, osageorange.	Eastern white pine, pin oak.	---
399A:					
Wea	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
399B:					
Wea	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
435A:					
Streator	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, eastern white pine.	Pin oak.
484A:					
Harco	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
536.					
Dumps, mine					
541B2:					
Graymont	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
541C2:					
Graymont	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
549G:					
Marseilles	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
567B:					
Elkhart	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
567C2:					
Elkhart	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
570A:					
Martinsville	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
570C:					
Martinsville	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
614A:					
Chenoa	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine.
618D2:					
Senachwine	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
618E:					
Senachwine	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
802B:					
Orthents	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
865. Pits, gravel					
883F: Senachwine	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
Hennepin	Silky dogwood, gray dogwood.	Washington hawthorn, eastern redcedar, osageorange.	Northern catalpa, honeylocust.	---	---
3028A: Jules	Silky dogwood	---	Washington hawthorn, green ash, eastern redcedar, osageorange, white spruce, northern whitecedar, nannyberry.	Black willow	---
3360L: Slacwater	---	Nannyberry, blackhaw.	Washington hawthorn, eastern redcedar, white spruce, northern whitecedar.	---	---
3480L: Moundprairie	---	Common lilac, northern whitecedar.	Common hackberry, eastern redcedar, white spruce, bur oak.	Green ash, honeylocust.	Eastern cottonwood.
7081A: Littleton	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, eastern white pine.	Pin oak.
7304B: Landes	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
8073A: Ross	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
8074A:					
Radford	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
8107A:					
Sawmill	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce, eastern white pine.	Pin oak.
8304A:					
Landes	Silky dogwood	---	White fir, Washington hawthorn, blue spruce, northern whitecedar.	Norway spruce	Eastern white pine, pin oak.
8368A:					
Raveenwash	---	Nannyberry, blackhaw.	Washington hawthorn, eastern redcedar, white spruce, northern whitecedar.	---	---

Table 9.--Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17A:					
Keomah----------	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Slight-----------	Slight.
17B2:					
Keomah----------	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Slight-----------	Slight.
19C3:					
Sylvan----------	Slight-----------	Slight-----------	Severe: slope.	Severe: erodes easily.	Slight.
19D3:					
Sylvan----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
24C2:					
Dodge-----------	Slight-----------	Slight-----------	Severe: slope.	Slight-----------	Slight.
24D2:					
Dodge-----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
25G:					
Hennepin--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
37B:					
Worthen---------	Slight-----------	Slight-----------	Moderate: slope.	Slight-----------	Slight.
43A:					
Ipava-----------	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
51A:					
Muscatune-------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
60C2:					
La Rose---------	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight-----------	Slight.
60D2:					
La Rose---------	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Slight-----------	Moderate: slope.
68A:					
Sable-----------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
86B:					
Osco	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
86B2:					
Osco	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
86C2:					
Osco	Slight	Slight	Severe: slope.	Slight	Slight.
88C2:					
Sparta	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
91B2:					
Swygert	Severe: percs slowly, wetness.	Severe: percs slowly.	Severe: percs slowly, wetness.	Severe: erodes easily.	Moderate: droughty, wetness.
93G:					
Rodman	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
145B2:					
Saybrook	Slight	Slight	Moderate: slope.	Slight	Slight.
145C2:					
Saybrook	Slight	Slight	Severe: slope.	Slight	Slight.
148B:					
Proctor	Slight	Slight	Moderate: slope.	Slight	Slight.
150A:					
Onarga	Slight	Slight	Slight	Slight	Slight.
150C:					
Onarga	Slight	Slight	Severe: slope.	Slight	Slight.
152A:					
Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
154A:					
Flanagan	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
171B:					
Catlin	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
171B2:					
Catlin	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
171C2:					
Catlin	Moderate: wetness.	Moderate: wetness.	Severe: slope.	Slight	Slight.
194F:					
Morley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
198A:					
Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
199A:					
Plano	Slight	Slight	Slight	Slight	Slight.
199B:					
Plano	Slight	Slight	Moderate: slope.	Slight	Slight.
223B2:					
Varna	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: slope, small stones, wetness.	Slight	Moderate: large stones.
223C2:					
Varna	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Severe: slope.	Slight	Moderate: large stones.
224D3:					
Strawn	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
224E:					
Strawn	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
233B:					
Birkbeck	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
233B2:					
Birkbeck	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
233C2:					
Birkbeck	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
236A:					
Sabina	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
243B:					
St. Charles	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
244A:					
Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
257A:					
Clarksdale	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
279B:					
Rozetta	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
279B2:					
Rozetta	Slight	Slight	Moderate: slope, wetness.	Slight	Slight.
279C2:					
Rozetta	Slight	Slight	Severe: slope.	Slight	Slight.
280C2:					
Fayette	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
280D:					
Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
356A:					
Elpaso	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
375A:					
Rutland	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
375B2:					
Rutland	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
379A:					
Dakota	Slight	Slight	Moderate: small stones.	Slight	Slight.
379B:					
Dakota	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
383B:					
New Vienna	Slight	Slight	Moderate: slope.	Slight	Slight.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
388B2:					
Wenona	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight	Slight.
399A:					
Wea	Slight	Slight	Slight	Slight	Slight.
399B:					
Wea	Slight	Slight	Moderate: slope.	Slight	Slight.
435A:					
Streator	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
484A:					
Harco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
536:					
Dumps, mine.					
541B2:					
Graymont	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Slight	Slight.
541C2:					
Graymont	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Severe: slope.	Slight	Slight.
549G:					
Marseilles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
567B:					
Elkhart	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
567C2:					
Elkhart	Slight	Slight	Severe: slope.	Slight	Slight.
570A:					
Martinsville	Slight	Slight	Moderate: small stones.	Slight	Slight.
570C:					
Martinsville	Slight	Slight	Severe: slope.	Slight	Slight.
614A:					
Chenoa	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
618D2:					
Senachwine	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly, slope.	Severe: erodes easily.	Moderate: droughty, slope.
618E:					
Senachwine	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: erodes easily.	Severe: slope.
802B:					
Orthents	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
865:					
Pits, gravel.					
883F:					
Senachwine	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: erodes easily, slope.	Severe: slope.
Hennepin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
3028A:					
Jules	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3360L:					
Slacwater	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.
3480L:					
Moundprairie	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding.
7081A:					
Littleton	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
7304B:					
Landes	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
8073A:					
Ross	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
8074A:					
Radford	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: flooding, wetness.
8107A:					
Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8304A:					
Landes----------	Severe: flooding.	Slight-----------	Slight-----------	Slight-----------	Moderate: small stones.
8368A:					
Raveenwash------	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: flooding, wetness.

Table 10.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
17A: Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
17B2: Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
19C3: Sylvan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
19D3: Sylvan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
24C2: Dodge	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
24D2: Dodge	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
25G: Hennepin	Very poor.	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Good	Very poor.
37B: Worthen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
43A: Ipava	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
51A: Muscatune	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
60C2: La Rose	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
60D2: La Rose	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
68A: Sable	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
86B: Osco	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
86B2: Osco	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
86C2: Osco	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
88C2:										
Sparta	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
91B2:										
Swygert	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
93G:										
Rodman	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
145B2:										
Saybrook	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
145C2:										
Saybrook	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
148B:										
Proctor	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
150A:										
Onarga	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
150C:										
Onarga	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
152A:										
Drummer	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
154A:										
Flanagan	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
171B:										
Catlin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
171B2:										
Catlin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
171C2:										
Catlin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
194F:										
Morley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
198A:										
Elburn	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A:										
Plano	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
199B:										
Plano	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
223B2: Varna	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
223C2: Varna	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
224D3: Strawn	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
224E: Strawn	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
233B: Birkbeck	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
233B2: Birkbeck	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
233C2: Birkbeck	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
236A: Sabina	Good	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
243B: St. Charles	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
244A: Hartsburg	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
257A: Clarksdale	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
279B: Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
279B2: Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
279C2: Rozetta	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280C2: Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280D: Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
356A: Elpaso	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
375A: Rutland	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
375B2:										
Rutland	Good	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
379A:										
Dakota	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
379B:										
Dakota	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
383B:										
New Vienna	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
388B2:										
Wenona	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
399A:										
Wea	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
399B:										
Wea	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
435A:										
Streator	Good	Good	Good	Good	Good	Good	Good	Good	Good	Fair.
484A:										
Harco	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
536:										
Dumps, mine.										
541B2:										
Graymont	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
541C2:										
Graymont	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
549G:										
Marseilles	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
567B:										
Elkhart	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
567C2:										
Elkhart	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
570A:										
Martinsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
570C:										
Martinsville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
614A:										
Chenoa	Good	Good	Good	Good	Good	Fair	Fair	Good	Poor	Fair.
618D2:										
Senachwine	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
618E:										
Senachwine	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
802B:										
Orthents	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
865:										
Pits, gravel.										
883F:										
Senachwine	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Hennepin	Very poor.	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Good	Very poor.
3028A:										
Jules	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
3360L:										
Slacwater	Poor	Fair	Fair	Poor	Poor	Good	Good	Good	Good	Good.
3480L:										
Moundprairie	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
7081A:										
Littleton	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
7304B:										
Landes	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8073A:										
Ross	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8074A:										
Radford	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
8107A:										
Sawmill	Good	Good	Good	Fair	Fair	Good	Fair	Good	Fair	Fair.
8304A:										
Landes	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
8368A:										
Raveenwash------	Poor	Fair	Fair	Poor	Poor	Good	Good	Good	Good	Good.

Table 11.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
17A:						
Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Slight.
17B2:						
Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Slight.
19C3:						
Sylvan	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
19D3:						
Sylvan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
24C2:						
Dodge	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
24D2:						
Dodge	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
25G:						
Hennepin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
37B:						
Worthen	Slight	Slight	Slight	Slight	Severe: frost action, low strength.	Slight.
43A:						
Ipava	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
51A:						
Muscatune	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
60C2:						
La Rose	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.	Slight.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
60D2:						
La Rose	Moderate: dense layer, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: low strength, shrink-swell, slope.	Moderate: slope.
68A:						
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
86B:						
Osco	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
86B2:						
Osco	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
86C2:						
Osco	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
88C2:						
Sparta	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
91B2:						
Swygert	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: droughty, wetness.
93G:						
Rodman	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
145B2:						
Saybrook	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: frost action, low strength.	Slight.
145C2:						
Saybrook	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Severe: frost action, low strength.	Slight.
148B:						
Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
150A:						
Onarga	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
150C:						
Onarga	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
152A:						
Drummer	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
154A:						
Flanagan	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell, wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
171B:						
Catlin	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
171B2:						
Catlin	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
171C2:						
Catlin	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Slight.
194F:						
Morley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
198A:						
Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
199A:						
Plano	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
199B:						
Plano	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
223B2:						
Varna	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Moderate: large stones.
223C2:						
Varna	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Moderate: large stones.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
224D3:						
Strawn----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: frost action, low strength, slope.	Moderate: slope.
224E:						
Strawn----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
233B:						
Birkbeck--------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
233B2:						
Birkbeck--------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
233C2:						
Birkbeck--------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
236A:						
Sabina----------	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell, wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
243B:						
St. Charles-----	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
244A:						
Hartsburg-------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
257A:						
Clarksdale------	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
279B:						
Rozetta---------	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
279B2:						
Rozetta---------	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
279C2:						
Rozetta	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Slight.
280C2:						
Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
280D:						
Fayette	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
356A:						
Elpaso	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
375A:						
Rutland	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
375B2:						
Rutland	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
379A:						
Dakota	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action, low strength.	Slight.
379B:						
Dakota	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action, low strength.	Slight.
383B:						
New Vienna	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
388B2:						
Wenona	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
399A:						
Wea	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
399B:						
Wea	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
435A:						
Streator	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
484A:						
Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
536:						
Dumps, mine.						
541B2:						
Graymont	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
541C2:						
Graymont	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Slight.
549G:						
Marseilles	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
567B:						
Elkhart	Moderate: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
567C2:						
Elkhart	Moderate: wetness.	Moderate: shrink-swell.	Severe: wetness.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
570A:						
Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Slight.
570C:						
Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.	Slight.
614A:						
Chenoa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
618D2:						
Senachwine	Slight	Moderate: shrink-swell, slope.	Slight	Severe: slope.	Severe: low strength.	Moderate: droughty, slope.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
618E:						
Senachwine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
802B:						
Orthents	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
865:						
Pits, gravel.						
883F:						
Senachwine	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Hennepin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
3028A:						
Jules	Moderate: flooding.	Severe*: flooding.	Severe*: flooding.	Severe*: flooding.	Severe: flooding, frost action.	Severe: flooding.
3360L:						
Slacwater	Severe: ponding.	Severe*: flooding, ponding.	Severe*: flooding, ponding.	Severe*: flooding, ponding.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding.
3480L:						
Moundprairie	Severe: wetness.	Severe*: flooding, wetness.	Severe*: flooding, wetness.	Severe*: flooding, wetness.	Severe: flooding, frost action, low strength.	Severe: flooding.
7081A:						
Littleton	Severe: wetness.	Severe: flooding, wetness.	Severe*: flooding, wetness.	Severe*: flooding, wetness.	Severe: frost action, low strength.	Moderate: wetness.
7304B:						
Landes	Severe: cutbanks cave.	Severe: flooding.	Severe*: flooding.	Severe*: flooding.	Moderate: flooding, frost action.	Slight.
8073A:						
Ross	Moderate: flooding, wetness.	Severe: flooding.	Severe*: flooding.	Severe*: flooding.	Severe: flooding.	Moderate: flooding.
8074A:						
Radford	Severe: wetness.	Severe: flooding, wetness.	Severe*: flooding.	Severe*: flooding.	Severe: flooding, frost action, low strength.	Moderate: flooding, wetness.

See footnote at end of table.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8107A:						
Sawmill---------	Severe: wetness.	Severe: flooding, wetness.	Severe*: flooding.	Severe*: flooding.	Severe: flooding, low strength, wetness.	Severe: wetness.
8304A:						
Landes----------	Severe: cutbanks cave.	Severe: flooding.	Severe*: flooding.	Severe*: flooding.	Severe: flooding.	Moderate: small stones.
8368A:						
Raveenwash------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe*: flooding.	Severe*: flooding.	Severe: flooding, frost action.	Moderate: flooding, wetness.

* Because the limitations are so severe, the soil is generally unsuited to the specified use.

Table 12.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
17A:					
Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
17B2:					
Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
19C3:					
Sylvan	Slight	Severe: slope.	Slight	Slight	Good.
19D3:					
Sylvan	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
24C2:					
Dodge	Moderate: percs slowly.	Severe: slope.	Slight	Slight	Fair: small stones.
24D2:					
Dodge	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope, small stones.
25G:					
Hennepin	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
37B:					
Worthen	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
43A:					
Ipava	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
51A:					
Muscatune	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
60C2:					
La Rose	Severe: percs slowly.	Severe: slope.	Slight	Slight	Good.
60D2:					
La Rose	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
68A:					
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
86B:					
Osco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
86B2:					
Osco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
86C2:					
Osco	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
88C2:					
Sparta	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
91B2:					
Swygert	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
93G:					
Rodman	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, small stones, too sandy.
145B2:					
Saybrook	Severe: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
145C2:					
Saybrook	Severe: wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
148B:					
Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer, too clayey.
150A:					
Onarga	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
150C:					
Onarga	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: thin layer.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
152A:					
Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: ponding, too clayey.
154A:					
Flanagan	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
171B:					
Catlin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
171B2:					
Catlin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
171C2:					
Catlin	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
194F:					
Morley	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: hard to pack, slope, too clayey.
198A:					
Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199A:					
Plano	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.
199B:					
Plano	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.
223B2:					
Varna	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: hard to pack, too clayey.
223C2:					
Varna	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: too clayey.	Moderate: wetness.	Poor: hard to pack, too clayey.
224D3:					
Strawn	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, small stones, too clayey.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
224E:					
Strawn	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
233B:					
Birkbeck	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
233B2:					
Birkbeck	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
233C2:					
Birkbeck	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
236A:					
Sabina	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
243B:					
St. Charles	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
244A:					
Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
257A:					
Clarksdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
279B:					
Rozetta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
279B2:					
Rozetta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
279C2:					
Rozetta	Moderate: wetness.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
280C2:					
Fayette	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
280D:					
Fayette	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
356A:					
Elpaso	Severe: percs slowly, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
375A:					
Rutland	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
375B2:					
Rutland	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
379A:					
Dakota	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, small stones, too sandy.
379B:					
Dakota	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, small stones, too sandy.
383B:					
New Vienna	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
388B2:					
Wenona	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: hard to pack, too clayey.
399A:					
Wea	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Poor: small stones.
399B:					
Wea	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Poor: small stones.
435A:					
Streator	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
484A:					
Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
536:					
Dumps, mine.					

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
541B2:					
Graymont	Severe: percs slowly, wetness.	Moderate: seepage, slope.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
541C2:					
Graymont	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
549G:					
Marseilles	Severe: depth to rock, percs slowly, wetness.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
567B:					
Elkhart	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
567C2:					
Elkhart	Moderate: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
570A:					
Martinsville	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: thin layer, too clayey.
570C:					
Martinsville	Slight	Severe: slope.	Moderate: too clayey.	Slight	Fair: thin layer, too clayey.
614A:					
Chenoa	Severe: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
618D2:					
Senachwine	Severe: percs slowly, wetness.	Severe: slope.	Moderate: slope, wetness.	Moderate: slope, wetness.	Fair: slope, wetness.
618E:					
Senachwine	Severe: percs slowly, slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
802B:					
Orthents	Severe: percs slowly.	Moderate: slope, wetness.	Moderate: too clayey.	Slight	Fair: too clayey.
865:					
Pits, gravel.					

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
883F:					
Senachwine	Severe*: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hennepin	Severe*: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
3028A:					
Jules	Severe*: flooding.	Severe*: flooding.	Severe*: flooding.	Severe*: flooding.	Good.
3360L:					
Slacwater	Severe*: flooding.	Severe*: flooding.	Severe*: flooding.	Severe*: flooding.	Poor: ponding.
3480L:					
Moundprairie	Severe*: flooding.	Severe*: flooding.	Severe*: flooding.	Severe*: flooding.	Poor: wetness.
7081A:					
Littleton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
7304B:					
Landes	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
8073A:					
Ross	Severe*: flooding.	Severe: flooding, seepage.	Severe*: flooding.	Severe*: flooding.	Good.
8074A:					
Radford	Severe*: flooding.	Severe: flooding, wetness.	Severe*: flooding.	Severe*: flooding.	Poor: wetness.
8107A:					
Sawmill	Severe*: flooding.	Severe: flooding, wetness.	Severe*: flooding.	Severe*: flooding.	Poor: wetness.
8304A:					
Landes	Severe*: flooding.	Severe: flooding, seepage.	Severe*: flooding.	Severe*: flooding.	Poor: seepage, too sandy.
8368A:					
Raveenwash	Severe*: flooding.	Severe: flooding, seepage, wetness.	Severe*: flooding.	Severe*: flooding.	Poor: wetness.

* Because the limitations are so severe, the soil is generally unsuited to the specified use.

Table 13.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
17A:				
Keomah----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
17B2:				
Keomah----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
19C3:				
Sylvan----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
19D3:				
Sylvan----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
24C2:				
Dodge-----------	Good-------------------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
24D2:				
Dodge-----------	Good-------------------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, small stones.
25G:				
Hennepin--------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope, small stones.
37B:				
Worthen---------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
43A:				
Ipava-----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
51A:				
Muscatune-------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
60C2:				
La Rose---------	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
60D2:				
La Rose---------	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
68A:				
Sable-----------	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
86B:				
Osco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
86B2:				
Osco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
86C2:				
Osco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
88C2:				
Sparta	Good	Probable	Improbable: too sandy.	Poor: too sandy.
91B2:				
Swygert	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
93G:				
Rodman	Poor: slope.	Probable	Probable	Poor: area reclaim, small stones, too sandy.
145B2:				
Saybrook	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
145C2:				
Saybrook	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
148B:				
Proctor	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
150A:				
Onarga	Good	Probable	Improbable: too sandy.	Fair: area reclaim, thin layer.
150C:				
Onarga	Good	Probable	Improbable: too sandy.	Fair: area reclaim, thin layer.
152A:				
Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
154A:				
Flanagan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
171B:				
Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
171B2:				
Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
171C2:				
Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
194F:				
Morley	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
198A:				
Elburn	Fair: wetness.	Probable	Improbable: excess fines.	Good.
199A:				
Plano	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
199B:				
Plano	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
223B2:				
Varna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
223C2:				
Varna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
224D3:				
Strawn	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
224E:				
Strawn	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
233B:				
Birkbeck	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
233B2:				
Birkbeck	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
233C2:				
Birkbeck	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
236A:				
Sabina	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
243B:				
St. Charles	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
244A:				
Hartsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
257A:				
Clarksdale	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
279B:				
Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279B2:				
Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279C2:				
Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280C2:				
Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280D:				
Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
356A:				
Elpaso	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
375A:				
Rutland	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
375B2:				
Rutland	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
379A:				
Dakota	Good	Probable	Improbable: too sandy.	Poor: area reclaim, small stones.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
379B:				
Dakota	Good	Probable	Improbable: too sandy.	Poor: area reclaim, small stones.
383B:				
New Vienna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
388B2:				
Wenona	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
399A:				
Wea	Good	Probable	Probable	Poor: area reclaim, small stones.
399B:				
Wea	Good	Probable	Probable	Poor: area reclaim, small stones.
435A:				
Streator	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
484A:				
Harco	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
536:				
Dumps, mine.				
541B2:				
Graymont	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
541C2:				
Graymont	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
549G:				
Marseilles	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
567B:				
Elkhart	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
567C2:				
Elkhart	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
570A:				
Martinsville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
570C:				
Martinsville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
614A:				
Chenoa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
618D2:				
Senachwine	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
618E:				
Senachwine	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
802B:				
Orthents	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
865:				
Pits, gravel.				
883F:				
Senachwine	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hennepin	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope, small stones.
3028A:				
Jules	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
3360L:				
Slacwater	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3480L:				
Moundprairie	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
7081A:				
Littleton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
7304B:				
Landes	Good	Probable	Improbable: too sandy.	Fair: small stones, thin layer, too sandy.
8073A:				
Ross	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
8074A:				
Radford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
8107A:				
Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8304A:				
Landes	Good	Probable	Improbable: too sandy.	Fair: small stones, thin layer, too sandy.
8368A:				
Raveenwash	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too sandy.

Table 14.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
17A:							
Keomah	Slight	Moderate: wetness.	Severe: slow refill.	Frost action, percs slowly.	Percs slowly, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
17B2:							
Keomah	Slight	Moderate: wetness.	Severe: slow refill.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
19C3:							
Sylvan	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
19D3:							
Sylvan	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
24C2:							
Dodge	Moderate: seepage, slope.	Severe: piping, seepage.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
24D2:							
Dodge	Severe: slope.	Severe: piping, seepage.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
25G:							
Hennepin	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Rooting depth, slope.	Slope	Rooting depth, slope.
37B:							
Worthen	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
43A:							
Ipava	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
51A:							
Muscatune	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
60C2:							
La Rose	Moderate: slope.	Moderate: piping.	Severe: no water, slow refill.	Deep to water	Rooting depth, slope.	Favorable	Rooting depth.
60D2:							
La Rose	Severe: slope.	Moderate: piping.	Severe: no water, slow refill.	Deep to water	Rooting depth, slope.	Slope	Rooting depth, slope.
68A:							
Sable	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Frost action, ponding.	Ponding	Ponding	Wetness.
86B:							
Osco	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
86B2:							
Osco	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
86C2:							
Osco	Moderate: seepage, slope.	Moderate: piping.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
88C2:							
Sparta	Severe: seepage, slope.	Severe: piping, seepage.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, soil blowing, too sandy.	Droughty, slope.
91B2:							
Swygert	Moderate: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Frost action, percs slowly, slope.	Droughty, slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
93G:							
Rodman	Severe*: seepage.	Severe*: seepage.	Severe*: no water.	Deep to water	Droughty, slope.	Slope, too sandy.	Droughty, slope.

See footnote at end of table.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
145B2:							
Saybrook	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Deep to water	Slope	Erodes easily	Erodes easily.
145C2:							
Saybrook	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Deep to water	Slope	Erodes easily	Erodes easily.
148B:							
Proctor	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
150A:							
Onarga	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Soil blowing	Soil blowing	Favorable.
150C:							
Onarga	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
152A:							
Drummer	Moderate: seepage.	Severe: ponding.	Severe: cutbanks cave.	Frost action, ponding.	Ponding	Ponding	Wetness.
154A:							
Flanagan	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
171B:							
Catlin	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
171B2:							
Catlin	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
171C2:							
Catlin	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.

See footnote at end of table.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
194F:							
Morley----------	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, slope.
198A:							
Elburn----------	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Wetness--------	Erodes easily, wetness.	Erodes easily, wetness.
199A:							
Plano-----------	Severe: seepage.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Favorable------	Erodes easily	Erodes easily.
199B:							
Plano-----------	Severe: seepage.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Slope----------	Erodes easily	Erodes easily.
223B2:							
Varna-----------	Slight---------	Moderate: hard to pack, wetness.	Severe: no water.	Frost action, slope.	Percs slowly, slope, wetness.	Wetness--------	Favorable.
223C2:							
Varna-----------	Moderate: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Frost action, slope.	Percs slowly, slope, wetness.	Wetness--------	Favorable.
224D3:							
Strawn----------	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
224E:							
Strawn----------	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
233B:							
Birkbeck--------	Moderate: seepage, slope.	Moderate: piping, thin layer, wetness.	Severe: slow refill.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.

See footnote at end of table.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
233B2: Birkbeck	Moderate: seepage, slope.	Moderate: piping, thin layer, wetness.	Severe: slow refill.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
233C2: Birkbeck	Moderate: seepage, slope.	Moderate: piping, thin layer, wetness.	Severe: slow refill.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
236A: Sabina	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Erodes easily, wetness.	Erodes easily, wetness.	Erodes easily.
243B: St. Charles	Moderate: seepage, slope.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
244A: Hartsburg	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Frost action, ponding.	Ponding	Ponding	Wetness.
257A: Clarksdale	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Erodes easily, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
279B: Rozetta	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Erodes easily, slope, wetness.	Erodes easily, wetness.	Erodes easily.
279B2: Rozetta	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Erodes easily, slope, wetness.	Erodes easily, wetness.	Erodes easily.
279C2: Rozetta	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Erodes easily, slope, wetness.	Erodes easily, wetness.	Erodes easily.

See footnote at end of table.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
280C2:							
Fayette	Moderate: seepage, slope.	Slight	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
280D:							
Fayette	Severe: slope.	Slight	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
356A:							
Elpaso	Moderate: seepage.	Severe: ponding.	Severe: slow refill.	Frost action, ponding.	Ponding	Ponding	Wetness.
375A:							
Rutland	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Percs slowly, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
375B2:							
Rutland	Slight	Severe: wetness.	Severe: slow refill.	Frost action, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
379A:							
Dakota	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Favorable	Too sandy	Favorable.
379B:							
Dakota	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Slope	Too sandy	Favorable.
383B:							
New Vienna	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
388B2:							
Wenona	Slight	Moderate: hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope.	Favorable	Percs slowly.
399A:							
Wea	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable	Favorable.

See footnote at end of table.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
399B: Wea	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Favorable	Favorable.
435A: Streator	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Percs slowly, wetness.	Wetness	Wetness.
484A: Harco	Moderate: seepage.	Severe: thin layer, wetness.	Moderate: slow refill.	Frost action	Wetness	Wetness	Wetness.
536: Dumps, mine.							
541B2: Graymont	Slight	Moderate: hard to pack, piping, wetness.	Severe: slow refill.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, rooting depth.
541C2: Graymont	Moderate: seepage, slope.	Moderate: hard to pack, piping, wetness.	Severe: slow refill.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, rooting depth.
549G: Marseilles	Severe: slope.	Severe: thin layer.	Severe: no water.	Depth to rock, frost action, percs slowly.	Percs slowly, slope, wetness.	Depth to rock, erodes easily, slope.	Depth to rock, erodes easily, slope.
567B: Elkhart	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
567C2: Elkhart	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
570A: Martinsville	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable	Favorable.

See footnote at end of table.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
570C:							
Martinsville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
614A:							
Chenoa	Slight	Severe: wetness.	Severe: slow refill.	Frost action, percs slowly.	Percs slowly, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, rooting depth, wetness.
618D2:							
Senachwine	Severe: slope.	Moderate: piping.	Severe: no water.	Percs slowly, slope.	Droughty, slope, wetness.	Erodes easily, slope, wetness.	Droughty, erodes easily, slope.
618E:							
Senachwine	Severe: slope.	Moderate: piping.	Severe: no water.	Percs slowly, slope.	Droughty, slope, wetness.	Erodes easily, slope, wetness.	Droughty, erodes easily, slope.
802B:							
Orthents	Moderate: slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily, rooting depth, slope.	Erodes easily	Erodes easily, rooting depth.
865:							
Pits, gravel.							
883F:							
Senachwine	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Droughty, slope, wetness.	Erodes easily, slope, wetness.	Droughty, erodes easily, slope.
Hennepin	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Rooting depth, slope.	Slope	Rooting depth, slope.
3028A:							
Jules	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
3360L:							
Slacwater	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Flooding, frost action, ponding.	Flooding, ponding.	Ponding	Wetness.

See footnote at end of table.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
3480L:							
Moundprairie	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Wetness.
7081A:							
Littleton	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
7304B:							
Landes	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Slope	Too sandy	Favorable.
8073A:							
Ross	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Flooding	Favorable	Favorable.
8074A:							
Radford	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Wetness.
8107A:							
Sawmill	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Wetness.
8304A:							
Landes	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Favorable	Soil blowing, too sandy.	Favorable.
8368A:							
Raveenwash	Severe: seepage.	Severe: piping, seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave, flooding, frost action.	Flooding, wetness.	Too sandy, wetness.	Wetness.

* Because the limitations are so severe, the soil is generally unsuited to the specified use.

Table 15.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
17A:												
Keomah----------	0-10	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	10-13	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	4-15
	13-23	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
	23-80	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-30
17B2:												
Keomah----------	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	6-16	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
	16-80	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-30
19C3:												
Sylvan----------	0-9	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30
	9-20	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30
	20-80	Silt loam, silt	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	20-40	5-20
19D3:												
Sylvan----------	0-5	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30
	5-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30
	30-80	Silt loam, silt	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	20-40	5-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
24C2:												
Dodge-----------	0-6	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	90-100	85-95	20-30	3-10
	6-32	Silty clay loam, silt loam.	CH, CL	A-6, A-7	0	0	100	100	90-100	85-95	35-55	15-32
	32-38	Clay loam, sandy clay loam, sandy loam.	CL, SC	A-2, A-4, A-6, A-7	0	0-2	90-100	85-100	50-100	25-80	25-45	8-25
	38-80	Gravelly loam, gravelly sandy loam, loam.	CL, ML, SC, SM	A-1, A-2, A-4	0	0-3	75-95	65-95	35-95	15-75	15-30	NP-10
24D2:												
Dodge-----------	0-6	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	90-100	85-95	20-30	3-10
	6-32	Silty clay loam, silt loam.	CH, CL	A-6, A-7	0	0	100	100	90-100	85-95	35-55	15-32
	32-38	Clay loam, sandy clay loam, sandy loam.	CL, SC	A-2, A-4, A-6, A-7	0	0-2	90-100	85-100	50-100	25-80	25-45	8-25
	38-80	Gravelly loam, gravelly sandy loam, loam.	CL, ML, SC, SM	A-1, A-2, A-4	0	0-3	75-95	65-95	35-95	15-75	15-30	NP-10
25G:												
Hennepin--------	0-3	Loam-----------	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	90-100	85-100	70-100	60-95	25-45	5-20
	3-16	Loam, clay loam, silt loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25
	16-80	Loam, clay loam, silt loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25
37B:												
Worthen---------	0-24	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	80-100	25-40	7-21
	24-60	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	80-100	25-40	7-21
43A:												
Ipava-----------	0-8	Silt loam------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	8-49	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	49-80	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
51A:												
Muscatune-------	0-17	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
	17-46	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	20-30
	46-80	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
60C2:												
La Rose---------	0-7	Silty clay loam	CL	A-6, A-7	0	0	95-100	90-100	85-100	75-90	30-45	15-25
	7-17	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	60-85	30-45	15-25
	17-80	Loam, silt loam	CL	A-6	0	0-5	95-100	85-100	75-95	50-80	25-40	10-20
60D2:												
La Rose---------	0-6	Silt loam------	CL	A-4, A-6	0	0	100	95-100	90-100	60-95	30-40	8-15
	6-18	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	60-85	30-45	15-25
	18-60	Loam, silt loam	CL	A-6	0	0-5	95-100	85-100	75-95	50-80	25-40	10-20
68A:												
Sable-----------	0-14	Silty clay loam	CH, CL, MH, ML	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	14-50	Silty clay loam, silt loam.	CH, CL	A-7	0	0	100	100	95-100	95-100	40-55	20-35
	50-80	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
86B:												
Osco------------	0-11	Silt loam------	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
	11-43	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	0	100	100	100	95-100	40-50	15-25
	43-80	Silt loam, silty clay loam.	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
86B2:												
Osco------------	0-9	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	9-39	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	0	100	100	100	95-100	40-50	15-25
	39-80	Silt loam, silty clay loam.	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
86C2:												
Osco------------	0-5	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	5-45	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	0	100	100	100	95-100	40-50	15-25
	45-80	Silt loam, silty clay loam.	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
88C2:												
Sparta----------	0-9	Loamy sand-----	SM	A-2, A-4	0	0	85-100	85-100	50-95	15-50	0-14	NP
	9-36	Loamy fine sand, fine sand, sand.	SM, SP-SM	A-2, A-3, A-4	0	0	85-100	85-100	50-95	5-50	0-14	NP
	36-80	Sand, fine sand	SM, SP, SP-SM	A-2, A-3	0	0	85-100	85-100	50-95	2-30	0-14	NP
91B2:												
Swygert---------	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	35-50	15-25
	8-15	Silty clay, silty clay loam.	CH, CL	A-6, A-7	0	0	100	95-100	95-100	85-95	35-55	15-30
	15-45	Silty clay, clay.	CH	A-7	0	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	45-80	Silty clay loam, silty clay, clay.	CH, CL	A-7	0	0-5	95-100	95-100	90-100	75-95	40-65	20-40
93G:												
Rodman----------	0-7	Gravelly sandy loam.	CL, ML, SC, SM	A-4	0	0-2	70-85	65-75	60-75	36-65	0-30	3-9
	7-13	Gravelly loam, sandy loam, loam.	CL, ML, SC, SM	A-1, A-2, A-4	0	0-2	70-85	60-85	40-75	20-55	0-30	NP-10
	13-80	Stratified sand to extremely gravelly coarse sand.	GP, GP-GM, SP, SP-SM	A-1	0-1	1-5	30-70	22-50	7-20	2-10	0-14	NP

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
145B2:												
Saybrook--------	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-25
	8-27	Silty clay loam, silt loam.	CH, CL	A-6, A-7	0	0	95-100	95-100	90-100	85-100	35-55	15-30
	27-80	Loam, silt loam, clay loam.	CL	A-4, A-6	0	0	95-100	85-100	80-95	60-85	20-40	8-25
145C2:												
Saybrook--------	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-25
	8-30	Silty clay loam, silt loam.	CH, CL	A-6, A-7	0	0	95-100	95-100	90-100	85-100	35-55	15-30
	30-59	Loam, silt loam, clay loam.	CL	A-4, A-6	0	0	95-100	85-100	80-95	60-85	20-40	8-25
	59-80	Loam, silt loam, clay loam.	CL	A-4, A-6	0	0	95-100	85-100	80-95	60-85	20-40	8-25
148B:												
Proctor---------	0-12	Silt loam------	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	12-29	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	98-100	98-100	95-100	90-100	25-50	10-25
	29-35	Clay loam, sandy loam, loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	90-100	90-100	75-100	30-85	20-45	5-25
	35-60	Stratified loam to sand.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	85-100	85-100	50-100	25-85	20-40	5-20
150A:												
Onarga----------	0-12	Sandy loam-----	SC, SC-SM, SM	A-2, A-4, A-6	0	0	100	100	75-95	25-50	0-28	NP-12
	12-48	Loam, sandy clay loam, fine sandy loam.	CL, CL-ML, SC, SC-SM	A-2-4, A-2-6, A-4, A-6	0	0	95-100	95-100	75-95	30-60	19-32	5-14
	48-80	Stratified sand to sandy loam.	SC-SM, SM, SP-SM	A-2, A-4	0	0	85-100	80-100	70-95	12-50	0-20	NP-6

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
150C:												
Onarga----------	0-10	Sandy loam-----	SC, SC-SM, SM	A-2, A-4, A-6	0	0	100	100	75-95	25-50	0-28	NP-12
	10-30	Loam, sandy clay loam, fine sandy loam.	CL, CL-ML, SC, SC-SM	A-2-4, A-2-6, A-4, A-6	0	0	95-100	95-100	75-95	30-60	19-32	5-14
	30-80	Stratified sand to sandy loam.	SC-SM, SM, SP-SM	A-2, A-4	0	0	85-100	80-100	70-95	12-50	0-20	NP-6
152A:												
Drummer---------	0-14	Silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	85-95	25-40	5-15
	14-53	Silty clay loam, silt loam, silty clay.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	53-60	Stratified loamy sand to silty clay loam.	CL, SC	A-2-4, A-4, A-6	0	0-5	95-100	75-95	75-95	15-80	20-35	7-20
154A:												
Flanagan--------	0-13	Silt loam------	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-30
	13-42	Silty clay loam, silty clay, silt loam.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	15-30
	42-80	Loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	0	85-100	80-100	70-95	50-85	20-45	5-30
171B:												
Catlin----------	0-16	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	8-20
	16-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	90-100	90-100	80-100	30-50	15-30
	46-80	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20
171B2:												
Catlin----------	0-9	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	8-20
	9-49	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	90-100	90-100	80-100	30-50	15-30
	49-80	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
171C2:												
Catlin----------	0-9	Silty clay loam	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	8-20
	9-43	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	90-100	90-100	80-100	30-50	15-30
	43-80	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20
194F:												
Morley----------	0-7	Silt loam------	CL, CL-ML	A-4, A-6	0	0-5	95-100	95-100	90-100	75-95	25-40	5-15
	7-18	Silty clay loam, clay loam.	CL	A-6, A-7	0	0-10	95-100	90-100	85-95	80-90	30-50	15-30
	18-37	Silty clay loam, silty clay, clay.	CH, CL	A-6, A-7	0-1	0-10	95-100	90-100	85-95	80-90	30-60	15-35
	37-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-10	95-100	90-100	85-95	80-90	30-50	15-30
198A:												
Elburn----------	0-13	Silt loam------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
	13-50	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	15-35
	50-80	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	60-90	30-85	20-40	5-20
199A:												
Plano-----------	0-12	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-30	5-15
	12-56	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
	56-70	Clay loam, loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0-1	90-100	85-95	60-90	35-75	20-45	5-25
	70-80	Stratified silt loam to loamy sand.	CL, ML, SC, SM	A-2, A-4	0	0-5	90-100	70-95	60-90	15-70	0-25	NP-10

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
199B:												
Plano	0-15	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-30	5-15
	15-54	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
	54-66	Clay loam, loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0-1	90-100	85-95	60-90	35-75	20-45	5-25
	66-80	Stratified silt loam to loamy sand.	CL, ML, SC, SM	A-2, A-4	0	0-5	90-100	70-95	60-90	15-70	0-25	NP-10
223B2:												
Varna	0-7	Silty clay loam	CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-95	30-50	12-25
	7-29	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-100	35-56	15-29
	29-80	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-95	30-45	13-26
223C2:												
Varna	0-8	Silty clay loam	CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-95	30-50	12-25
	8-33	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-100	35-56	15-29
	33-80	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-10	95-100	85-100	85-100	80-95	30-45	13-26
224D3:												
Strawn	0-6	Silty clay loam	CL	A-6, A-7	0	0	90-100	90-100	80-95	80-95	30-45	10-25
	6-21	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-25
	21-80	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-20
224E:												
Strawn	0-5	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	95-100	95-100	90-100	90-100	20-40	3-20
	5-20	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-23
	20-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-18

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
233B:												
Birkbeck--------	0-7	Silt loam------	ML	A-4, A-6, A-7	0	0	100	100	95-100	95-100	28-45	5-15
	7-47	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-100	30-50	10-25
	47-55	Loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-85	25-40	5-20
	55-60	Loam, silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-85	20-40	5-20
233B2:												
Birkbeck--------	0-8	Silty clay loam	ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-20
	8-49	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-100	30-50	10-25
	49-63	Loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-85	25-40	5-20
	63-70	Loam, silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-85	20-40	5-20
233C2:												
Birkbeck--------	0-9	Silty clay loam	ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-20
	9-54	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-100	30-50	10-25
	54-60	Loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-85	25-40	5-20
	60-70	Loam, silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-85	20-40	5-20
236A:												
Sabina----------	0-11	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	11-52	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	85-100	40-60	20-40
	52-80	Clay loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	95-100	85-100	70-100	55-75	20-50	5-30

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
243B:												
St. Charles-----	0-12	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	95-100	22-35	7-15
	12-51	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	51-60	Clay loam, silt loam, sandy loam.	CL, SC	A-4, A-6	0	0	90-100	75-100	75-95	40-80	20-35	8-20
244A:												
Hartsburg-------	0-17	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-50	10-25
	17-49	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	95-100	40-55	20-30
	49-75	Silt loam, loam	CL	A-6	0	0	95-100	90-100	90-100	70-100	25-40	11-20
257A:												
Clarksdale------	0-8	Silt loam------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	8-11	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-18
	11-41	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-65	25-40
	41-52	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	25-45	10-25
	52-80	Silt loam------	CL	A-6	0	0	95-100	95-100	95-100	90-100	25-40	10-20
279B:												
Rozetta---------	0-7	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	7-10	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	20-30	5-15
	10-57	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	15-30
	57-80	Silt loam, silty clay loam.	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	7-20
279B2:												
Rozetta---------	0-7	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	7-52	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	15-30
	52-80	Silt loam, silty clay loam.	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	7-20
279C2:												
Rozetta---------	0-7	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	7-33	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	15-30
	33-80	Silt loam, silty clay loam.	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	7-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
280C2:												
Fayette---------	0-8	Silt loam------	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-25
	8-54	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	54-77	Silt loam------	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
280D:												
Fayette---------	0-11	Silt loam------	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-25
	11-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	60-80	Silt loam------	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
356A:												
Elpaso----------	0-19	Silty clay loam	CH, CL, MH, ML	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	19-56	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	95-100	30-45	10-25
	56-61	Silty clay loam, silt loam, loam.	CL	A-6	0	0	100	95-100	85-100	75-100	25-40	10-20
	61-80	Silty clay loam, silt loam, loam.	CL	A-6	0	0-5	95-100	85-100	70-100	50-95	25-40	10-20
375A:												
Rutland---------	0-14	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	30-40	8-15
	14-42	Silty clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	95-100	95-100	35-55	15-35
	42-80	Silty clay, clay.	CH, CL	A-7	0	0	100	100	95-100	85-100	40-60	20-35
375B2:												
Rutland---------	0-9	Silty clay loam	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	9-46	Silty clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	95-100	95-100	35-55	15-35
	46-80	Silty clay, clay.	CH, CL	A-7	0	0	100	100	95-100	85-100	40-60	20-35

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
379A:												
Dakota----------	0-14	Loam-----------	CL	A-4, A-6	0	0	95-100	85-100	75-95	50-75	25-35	7-15
	14-29	Loam, sandy clay loam, clay loam.	CL, SC	A-4, A-6	0	0	95-100	85-100	70-100	35-80	25-40	9-20
	29-37	Sandy loam, loamy sand, gravelly loamy coarse sand.	GM, GP, SM, SP	A-1, A-2, A-3, A-4	0-1	0-5	55-100	45-100	20-75	2-40	0-21	NP-4
	37-80	Sand, gravelly coarse sand, loamy sand.	GM, GP, SM, SP	A-1, A-2, A-3	0-1	0-5	50-100	45-100	20-75	2-30	0-14	NP
379B:												
Dakota----------	0-10	Loam-----------	CL	A-4, A-6	0	0	95-100	85-100	75-95	50-75	25-35	7-15
	10-30	Loam, sandy clay loam, clay loam.	CL, SC	A-4, A-6	0	0	95-100	85-100	70-100	35-80	25-40	9-20
	30-35	Sandy loam, loamy sand, gravelly loamy coarse sand.	GM, GP, SM, SP	A-1, A-2, A-3, A-4	0-1	0-5	55-100	45-100	20-75	2-40	0-21	NP-4
	35-80	Sand, gravelly coarse sand, loamy sand.	GM, GP, SM, SP	A-1, A-2, A-3	0-1	0-5	50-100	45-100	20-75	2-30	0-14	NP
383B:												
New Vienna------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	8-55	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	55-80	Silt loam------	CL	A-6	0	0	100	100	100	95-100	30-40	11-20
388B2:												
Wenona----------	0-9	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	30-40	8-15
	9-40	Silty clay, silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	17-35
	40-80	Silty clay, clay.	CH, CL	A-7	0-1	0-5	100	100	90-100	85-95	40-60	17-35

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
399A:												
Wea-------------	0-17	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	75-100	50-100	20-40	3-20
	17-29	Silty clay loam, clay loam, loam.	CL, CL-ML, ML	A-4, A-6, A-7-6	0	0	90-100	85-100	75-100	50-90	20-60	3-35
	29-51	Gravelly loam, gravelly sandy loam, gravelly sandy clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-2-4, A-4, A-6	0	0-5	60-90	50-75	30-75	15-60	15-40	NP-20
	51-80	Stratified gravelly loamy sand to very gravelly coarse sand.	GW, SP-SM, SW, SW-SM	A-1-a, A-1-b	0-1	1-5	45-80	30-70	10-40	0-10	---	NP
399B:												
Wea-------------	0-14	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	75-100	50-100	20-40	3-20
	14-23	Silty clay loam, clay loam, loam.	CL, CL-ML, ML	A-4, A-6, A-7-6	0	0	90-100	85-100	75-100	50-90	20-60	3-35
	23-40	Gravelly loam, gravelly sandy loam, gravelly sandy clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-2-4, A-4, A-6	0	0-5	60-90	50-75	30-75	15-60	15-40	NP-20
	40-80	Stratified gravelly loamy sand to very gravelly coarse sand.	GW, SP-SM, SW, SW-SM	A-1-a, A-1-b	0-1	1-5	45-80	30-70	10-40	0-10	---	NP
435A:												
Streator--------	0-13	Silty clay loam	CL	A-4, A-6	0	0	100	100	95-100	95-100	30-40	8-16
	13-42	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	95-100	40-55	20-35
	42-80	Silty clay, clay.	CH, CL	A-7	0-1	0-5	100	100	90-100	85-95	40-55	20-35
484A:												
Harco-----------	0-15	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	2-13
	15-31	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	14-27
	31-80	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	95-100	90-100	20-35	2-13

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	Percentage passing sieve number--: 10	Percentage passing sieve number--: 40	Percentage passing sieve number--: 200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
536:												
Dumps, mine.												
541B2:												
Graymont--------	0-9	Silty clay loam	MH, ML	A-4, A-6, A-7	0	0	100	100	95-100	90-100	32-51	8-21
	9-29	Silty clay loam, silty clay, silt loam.	MH, ML	A-4, A-6, A-7	0	0	100	100	95-100	90-100	33-58	8-27
	29-80	Silty clay loam, silt loam.	CH, CL	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	25-53	9-27
541C2:												
Graymont--------	0-6	Silty clay loam	MH, ML	A-4, A-6, A-7	0	0	100	100	95-100	90-100	32-51	8-21
	6-32	Silty clay loam, silty clay, silt loam.	MH, ML	A-4, A-6, A-7	0	0	100	100	95-100	90-100	33-58	8-27
	32-80	Silty clay loam, silt loam.	CH, CL	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	25-53	9-27
549G:												
Marseilles------	0-2	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	2-22	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-50	15-25
	22-38	Clay loam, silty clay, silt loam.	CH, CL	A-7	0-5	0-20	90-100	90-100	85-100	70-100	40-60	15-30
	38-80	Weathered bedrock.	---	---	0	0	0	0	0	0	---	NP
567B:												
Elkhart---------	0-13	Silt loam------	CL	A-4, A-6	0	0	100	100	100	95-100	25-35	8-15
	13-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	18-30
	30-80	Silt loam, silt	CL	A-4, A-6	0	0	100	100	95-100	95-100	20-37	8-20
567C2:												
Elkhart---------	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	18-30
	8-34	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	18-30
	34-80	Silt loam, silt	CL	A-4, A-6	0	0	100	100	95-100	95-100	20-37	8-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
570A:												
Martinsville----	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	85-100	70-100	50-90	23-40	3-20
	8-12	Clay loam, silty clay loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	95-100	85-100	70-100	30-90	20-50	5-35
	12-46	Clay loam, loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	95-100	85-100	70-100	30-75	20-50	5-30
	46-62	Loam, sandy clay loam, sandy loam.	CL-ML, SC, SC-SM, SM	A-2-4, A-2-6, A-4, A-6	0	0	95-100	85-100	50-95	25-70	10-40	NP-20
	62-80	Stratified silt loam to sand.	CL, ML, SC, SM	A-1-b, A-2-4, A-4	0	0	95-100	85-100	40-95	20-75	0-30	NP-10
570C:												
Martinsville----	0-5	Fine sandy loam	SC, SC-SM, SM	A-2-4, A-4	0	0	100	85-100	50-85	25-45	0-25	NP-10
	5-9	Clay loam, silty clay loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	95-100	85-100	70-100	30-90	20-50	5-35
	9-23	Clay loam, loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	95-100	85-100	70-100	30-75	20-50	5-30
	23-56	Loam, sandy clay loam, sandy loam.	CL-ML, SC, SC-SM, SM	A-2-4, A-2-6, A-4, A-6	0	0	95-100	85-100	50-95	25-70	10-40	NP-20
	56-60	Stratified silt loam to sand.	CL, ML, SC, SM	A-1-b, A-2-4, A-4	0	0	95-100	85-100	40-95	20-75	0-30	NP-10
614A:												
Chenoa----------	0-13	Silt loam------	CL, ML	A-4, A-6, A-7	0	0	100	100	95-100	90-100	32-48	8-21
	13-36	Silty clay loam, silty clay.	MH, ML	A-4, A-6, A-7	0	0	100	100	95-100	90-100	33-58	8-27
	36-43	Silty clay loam, silt loam.	CH, CL	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27
	43-80	Silty clay loam, silt loam.	CH, CL	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
618D2:												
Senachwine------	0-5	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-95	60-85	20-37	NP-17
	5-32	Clay loam, silty clay loam.	CL	A-6, A-7-6	0-1	0-3	90-98	85-98	85-95	55-85	30-50	11-31
	32-37	Loam, fine sandy loam.	CL, ML, SC, SM	A-4, A-6	0-1	0-3	90-98	85-98	65-95	40-70	15-37	NP-22
	37-80	Loam, fine sandy loam.	CL, ML, SC, SM	A-4, A-6	0-1	0-3	90-98	85-98	65-90	40-70	15-30	NP-15
618E:												
Senachwine------	0-11	Loam-----------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-95	60-85	20-37	NP-17
	11-28	Clay loam, silty clay loam.	CL	A-6, A-7-6	0-1	0-3	90-98	85-98	85-95	55-85	30-50	11-31
	28-44	Loam, fine sandy loam.	CL, ML, SC, SM	A-4, A-6	0-1	0-3	90-98	85-98	65-95	40-70	15-37	NP-22
	44-80	Loam, fine sandy loam.	CL, ML, SC, SM	A-4, A-6	0-1	0-3	90-98	85-98	65-90	40-70	15-30	NP-15
802B:												
Orthents--------	0-3	Loam-----------	CL	A-6	0-1	0-5	95-100	90-100	85-95	60-90	20-40	10-20
	3-60	Loam, silt loam, clay loam.	CL	A-6	0-1	0-5	95-100	90-100	85-95	60-90	20-40	10-20
865:												
Pits, gravel.												
883F:												
Senachwine------	0-6	Loam-----------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-95	60-85	20-37	NP-17
	6-39	Clay loam, silty clay loam.	CL	A-6, A-7-6	0-1	0-3	90-98	85-98	85-95	55-85	30-50	11-31
	39-60	Loam, fine sandy loam.	CL, ML, SC, SM	A-4, A-6	0-1	0-3	90-98	85-98	65-90	40-70	15-30	NP-15
Hennepin--------	0-6	Loam-----------	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	90-100	85-100	70-100	60-95	25-45	5-20
	6-11	Loam, clay loam, silt loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25
	11-60	Loam, clay loam, silt loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0-1	0-5	85-100	75-100	65-100	35-95	20-50	5-25

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
3028A:												
Jules-----------	0-8	Silt loam------	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
	8-60	Silt loam------	ML	A-4	0	0	100	100	90-100	80-100	27-36	4-10
3360L:												
Slacwater-------	0-6	Silty clay loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	90-100	80-100	15-35	3-15
	6-60	Silt loam, silt, silty clay loam.	CL	A-6	0	0	100	95-100	90-100	85-100	25-40	10-25
3480L:												
Moundprairie----	0-10	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	80-100	35-50	12-25
	10-48	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	85-95	22-50	7-25
	48-80	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	85-95	65-85	22-50	5-25
7081A:												
Littleton-------	0-7	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	7-20
	7-26	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	7-20
	26-60	Silt loam------	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	95-100	80-100	20-45	5-20
7304B:												
Landes----------	0-13	Loam-----------	CL, CL-ML	A-4, A-6	0	0	100	90-100	85-100	50-75	20-35	5-15
	13-38	Loam, very fine sandy loam, loamy fine sand.	CL-ML, SC, SC-SM, SM	A-2-4, A-4	0	0	100	85-100	70-100	15-60	0-25	NP-15
	38-60	Stratified sand to silt loam.	SC, SC-SM, SM, SP-SM	A-2-4, A-4	0	0	100	85-100	70-85	10-50	0-30	NP-15
8073A:												
Ross------------	0-36	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-100	65-95	20-35	NP-12
	36-54	Loam, silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	90-100	85-100	70-100	55-95	22-45	3-20
	54-80	Stratified gravelly sandy loam to silt loam.	CL, GM, ML, SM	A-2, A-4, A-6	0	0-5	65-100	45-100	30-100	25-80	0-30	NP-12

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
8074A:												
Radford---------	0-7	Silt loam------	CL, ML	A-4, A-6	0	0	100	100	95-100	80-100	30-40	5-15
	7-35	Silt loam------	CL, ML	A-4, A-6	0	0	100	100	95-100	80-100	25-35	5-15
	35-80	Silt loam, silty clay loam, clay loam.	CL	A-6, A-7	0	0	100	100	95-100	80-95	35-50	15-25
8107A:												
Sawmill---------	0-19	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	19-33	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	33-60	Silty clay loam, clay loam, loam.	CL	A-4, A-6, A-7	0	0	100	100	85-100	70-95	25-50	8-25
	60-80	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	0	100	100	75-100	65-95	20-50	8-30
8304A:												
Landes----------	0-20	Fine sandy loam	SC, SC-SM, SM	A-2-4, A-4	0	0	100	70-100	70-95	20-50	5-25	NP-10
	20-43	Loam, very fine sandy loam, loamy fine sand.	CL-ML, SC, SC-SM, SM	A-2-4, A-4	0	0	100	85-100	70-100	15-60	0-25	NP-15
	43-80	Stratified sand to silt loam.	SC, SC-SM, SM, SP-SM	A-2-4, A-4	0	0	100	85-100	70-85	10-50	0-30	NP-15
8368A:												
Raveenwash------	0-5	Silt loam------	CL-ML, ML	A-4	0	0	100	90-100	80-100	50-75	25-35	4-10
	5-80	Silt loam, loam, loamy sand.	CL-ML, ML, SC, SM	A-2-4, A-4, A-6	0	0	100	90-100	80-100	10-70	20-30	3-13

Table 16.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
17A:												
Keomah----------	0-10	16-26	1.30-1.40	0.60-2.00	0.22-0.24	Low------	1.0-3.0	0.37	0.37	3	6	48
	10-13	16-26	1.35-1.45	0.20-0.60	0.18-0.20	Low------	0.2-1.0	0.37	0.37			
	13-23	35-42	1.30-1.45	0.06-0.60	0.18-0.20	High-----	0.0-0.5	0.37	0.37			
	23-80	24-38	1.40-1.55	0.20-0.60	0.18-0.20	Moderate	0.0-0.5	0.37	0.37			
17B2:												
Keomah----------	0-6	16-26	1.30-1.40	0.60-2.00	0.22-0.24	Low------	0.5-1.0	0.37	0.37	3	6	48
	6-16	35-42	1.30-1.45	0.06-0.60	0.18-0.20	High-----	0.0-0.5	0.37	0.37			
	16-80	24-38	1.40-1.55	0.20-0.60	0.18-0.20	Moderate	0.0-0.5	0.37	0.37			
19C3:												
Sylvan----------	0-9	27-32	1.25-1.45	0.60-2.00	0.20-0.22	Moderate	0.5-1.0	0.37	0.37	5	7	---
	9-20	25-35	1.30-1.50	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.37	0.37			
	20-80	10-27	1.30-1.50	0.60-2.00	0.20-0.22	Low------	0.0-0.5	0.49	0.49			
19D3:												
Sylvan----------	0-5	27-32	1.25-1.45	0.60-2.00	0.20-0.22	Moderate	0.5-1.0	0.37	0.37	5	7	---
	5-30	25-35	1.30-1.50	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.37	0.37			
	30-80	10-27	1.30-1.50	0.60-2.00	0.20-0.22	Low------	0.0-0.5	0.49	0.49			
24C2:												
Dodge-----------	0-6	10-20	1.35-1.55	0.60-2.00	0.22-0.24	Low------	0.5-1.0	0.37	0.37	5	5	56
	6-32	25-32	1.45-1.55	0.60-2.00	0.18-0.22	Moderate	---	0.37	0.37			
	32-38	15-32	1.45-1.55	0.60-2.00	0.10-0.19	Moderate	---	0.37	0.37			
	38-80	10-25	1.40-1.80	0.20-0.60	0.08-0.18	Low------	---	0.24	0.37			
24D2:												
Dodge-----------	0-6	10-20	1.35-1.55	0.60-2.00	0.22-0.24	Low------	0.5-1.0	0.37	0.37	5	5	56
	6-32	25-32	1.45-1.55	0.60-2.00	0.18-0.22	Moderate	---	0.37	0.37			
	32-38	15-32	1.45-1.55	0.60-2.00	0.10-0.19	Moderate	---	0.37	0.37			
	38-80	10-25	1.40-1.80	0.20-0.60	0.08-0.18	Low------	---	0.24	0.37			
25G:												
Hennepin--------	0-3	20-30	1.20-1.40	0.60-2.00	0.18-0.24	Low------	1.0-2.0	0.28	---	5	6	48
	3-16	18-30	1.30-1.60	0.20-0.60	0.14-0.22	Low------	0.0-0.5	0.32	0.32			
	16-80	18-30	1.70-1.85	0.20-0.60	0.10-0.15	Low------	0.0-0.5	0.32	0.32			
37B:												
Worthen---------	0-24	12-22	1.20-1.40	0.60-2.00	0.22-0.24	Low------	2.0-4.0	0.32	0.32	5	6	48
	24-60	15-26	1.20-1.40	0.60-2.00	0.20-0.22	Low------	0.5-2.0	0.49	0.49			
43A:												
Ipava-----------	0-8	20-27	1.15-1.35	0.60-2.00	0.22-0.24	Moderate	4.0-5.0	0.28	0.28	5	6	48
	8-49	35-43	1.25-1.50	0.20-0.60	0.11-0.20	High-----	0.5-1.0	0.43	0.43			
	49-80	20-30	1.30-1.55	0.20-0.60	0.20-0.22	Moderate	0.0-0.5	0.43	0.43			
51A:												
Muscatune-------	0-17	24-27	1.28-1.32	0.60-2.00	0.22-0.24	Moderate	4.0-6.0	0.28	0.28	5	6	48
	17-46	30-35	1.28-1.35	0.60-2.00	0.18-0.20	Moderate	1.0-2.0	0.43	0.43			
	46-80	22-30	1.35-1.40	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.43	0.43			
60C2:												
La Rose---------	0-7	27-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.28	0.28	3	7	---
	7-17	27-35	1.35-1.55	0.60-2.00	0.15-0.20	Moderate	0.0-0.5	0.32	0.32			
	17-80	15-25	1.30-1.90	0.20-0.60	0.09-0.11	Moderate	0.0-0.5	0.32	0.32			

Table 16.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
60D2:												
La Rose---------	0-6	18-27	1.10-1.35	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.28	0.28	3	6	48
	6-18	27-35	1.35-1.55	0.60-2.00	0.15-0.20	Moderate	0.0-0.5	0.32	0.32			
	18-60	15-25	1.30-1.90	0.20-0.60	0.09-0.11	Moderate	0.0-0.5	0.32	0.32			
68A:												
Sable-----------	0-14	27-35	1.15-1.35	0.60-2.00	0.21-0.23	Moderate	5.0-6.0	0.28	0.28	5	7	---
	14-50	24-35	1.30-1.50	0.60-2.00	0.18-0.20	Moderate	0.2-1.0	0.28	0.28			
	50-80	20-28	1.30-1.50	0.60-2.00	0.20-0.22	Low------	0.2-0.5	0.28	0.28			
86B:												
Osco------------	0-11	20-26	1.25-1.30	0.60-2.00	0.22-0.24	Moderate	3.0-4.0	0.28	0.28	5	6	48
	11-43	24-35	1.30-1.35	0.60-2.00	0.18-0.20	Moderate	0.0-1.0	0.43	0.43			
	43-80	20-30	1.35-1.40	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
86B2:												
Osco------------	0-9	27-35	1.25-1.30	0.60-2.00	0.22-0.24	Moderate	1.0-3.0	0.32	0.32	4	7	---
	9-39	24-35	1.30-1.35	0.60-2.00	0.18-0.20	Moderate	0.0-1.0	0.43	0.43			
	39-80	20-30	1.35-1.40	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
86C2:												
Osco------------	0-5	27-35	1.25-1.30	0.60-2.00	0.22-0.24	Moderate	1.0-3.0	0.32	0.32	4	7	---
	5-45	24-35	1.30-1.35	0.60-2.00	0.18-0.20	Moderate	0.0-1.0	0.43	0.43			
	45-80	20-30	1.35-1.40	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
88C2:												
Sparta----------	0-9	3-10	1.20-1.40	2.00-6.00	0.09-0.12	Low------	1.0-2.0	0.17	0.17	5	2	134
	9-36	1-8	1.40-1.60	6.00-20.00	0.05-0.11	Low------	0.1-1.0	0.17	0.17			
	36-80	0-5	1.50-1.70	6.00-20.00	0.04-0.07	Low------	0.0-0.5	0.17	0.17			
91B2:												
Swygert---------	0-8	27-40	1.25-1.50	0.20-0.60	0.18-0.22	Moderate	1.0-3.0	0.37	0.37	5	7	---
	8-15	30-45	1.30-1.55	0.20-0.60	0.08-0.16	High-----	1.0-3.0	0.28	0.28			
	15-45	45-50	1.40-1.70	0.06-0.20	0.05-0.12	High-----	0.5-1.0	0.28	0.28			
	45-80	38-60	1.40-1.75	0.00-0.06	0.03-0.05	High-----	0.0-0.5	0.28	0.28			
93G:												
Rodman----------	0-7	8-25	1.20-1.50	2.00-6.00	0.10-0.12	Low------	2.0-4.0	0.20	0.32	3	8	---
	7-13	5-25	1.10-1.50	2.00-6.00	0.09-0.12	Low------	0.0-2.0	0.20	0.32			
	13-80	0-10	1.60-1.70	>20.00	0.02-0.04	Low------	0.0-1.0	0.10	0.37			
145B2:												
Saybrook--------	0-8	27-29	1.15-1.35	0.60-2.00	0.21-0.23	Moderate	2.0-3.0	0.32	0.32	5	7	---
	8-27	25-35	1.20-1.40	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.43	0.43			
	27-80	24-35	1.50-1.70	0.20-0.60	0.15-0.21	Low------	0.2-0.5	0.37	0.37			
145C2:												
Saybrook--------	0-8	27-29	1.15-1.35	0.60-2.00	0.21-0.23	Moderate	2.0-3.0	0.32	0.32	5	7	---
	8-30	25-35	1.20-1.40	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.43	0.43			
	30-59	24-35	1.50-1.70	0.20-0.60	0.15-0.21	Low------	0.2-0.5	0.37	0.37			
	59-80	24-35	1.50-1.70	0.20-0.60	0.15-0.21	Low------	0.2-0.5	0.37	0.37			
148B:												
Proctor---------	0-12	18-27	1.10-1.30	0.60-2.00	0.22-0.24	Low------	2.0-4.0	0.32	0.32	5	6	48
	12-29	25-35	1.20-1.45	0.60-2.00	0.18-0.20	Moderate	0.5-2.0	0.43	0.43			
	29-35	22-35	1.30-1.55	0.60-6.00	0.13-0.16	Moderate	0.2-1.0	0.32	0.32			
	35-60	10-20	1.40-1.70	0.60-6.00	0.07-0.19	Low------	0.2-0.5	0.17	0.28			
150A:												
Onarga----------	0-12	8-15	1.15-1.45	0.60-6.00	0.13-0.22	Low------	2.0-4.0	0.20	0.20	4	3	86
	12-48	15-18	1.45-1.70	0.60-6.00	0.15-0.19	Low------	---	0.20	0.20			
	48-80	2-10	1.65-1.90	6.00-20.00	0.05-0.13	Low------	---	0.15	0.17			

Table 16.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
150C:												
Onarga----------	0-10	8-15	1.15-1.45	0.60-6.00	0.13-0.22	Low------	2.0-4.0	0.20	0.20	4	3	86
	10-30	15-18	1.45-1.70	0.60-6.00	0.15-0.19	Low------	---	0.20	0.20			
	30-80	2-10	1.65-1.90	6.00-20.00	0.05-0.13	Low------	---	0.15	0.17			
152A:												
Drummer---------	0-14	27-35	1.10-1.30	0.60-2.00	0.22-0.24	Low------	5.0-7.0	0.28	0.28	5	6	48
	14-53	20-35	1.20-1.45	0.60-2.00	0.21-0.24	Moderate	0.0-1.0	0.28	0.28			
	53-60	10-32	1.40-1.70	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.32			
154A:												
Flanagan--------	0-13	20-27	1.20-1.40	0.60-2.00	0.22-0.24	Moderate	4.0-5.0	0.28	0.28	5	6	48
	13-42	25-42	1.25-1.45	0.60-2.00	0.15-0.22	High-----	0.0-1.0	0.43	0.43			
	42-80	20-30	1.45-1.70	0.20-0.60	0.15-0.22	Low------	0.0-0.5	0.37	0.37			
171B:												
Catlin----------	0-16	18-27	1.25-1.45	0.60-2.00	0.23-0.26	Low------	3.0-4.0	0.32	0.32	5	6	48
	16-46	27-35	1.25-1.55	0.60-2.00	0.18-0.20	Moderate	0.0-1.0	0.43	0.43			
	46-80	20-30	1.40-1.70	0.20-0.60	0.07-0.11	Low------	0.0-0.5	0.43	0.43			
171B2:												
Catlin----------	0-9	18-27	1.25-1.45	0.60-2.00	0.23-0.26	Low------	2.0-4.0	0.32	0.32	5	6	48
	9-49	27-35	1.25-1.55	0.60-2.00	0.18-0.20	Moderate	0.0-1.0	0.43	0.43			
	49-80	20-30	1.40-1.70	0.20-0.60	0.07-0.11	Low------	0.0-0.5	0.43	0.43			
171C2:												
Catlin----------	0-9	27-35	1.25-1.45	0.60-2.00	0.23-0.26	Low------	2.0-4.0	0.32	0.32	5	6	48
	9-43	27-35	1.25-1.55	0.60-2.00	0.18-0.20	Moderate	0.0-1.0	0.43	0.43			
	43-80	20-30	1.40-1.70	0.20-0.60	0.07-0.11	Low------	0.0-0.5	0.43	0.43			
194F:												
Morley----------	0-7	22-27	1.35-1.55	0.60-2.00	0.20-0.24	Low------	1.0-3.0	0.37	0.37	5	6	48
	7-18	27-40	1.45-1.65	0.20-0.60	0.18-0.20	Moderate	0.5-1.0	0.43	0.43			
	18-37	35-50	1.55-1.70	0.06-0.60	0.11-0.15	Moderate	0.2-0.5	0.43	0.43			
	37-60	27-40	1.60-1.80	0.06-0.60	0.07-0.12	Moderate	0.2-0.5	0.43	0.43			
198A:												
Elburn----------	0-13	22-27	1.10-1.30	0.60-2.00	0.22-0.24	Low------	4.0-5.0	0.28	0.28	5	6	48
	13-50	25-35	1.20-1.40	0.60-2.00	0.18-0.20	Moderate	0.5-2.0	0.43	0.43			
	50-80	15-30	1.50-1.70	0.60-6.00	0.12-0.18	Low------	0.0-0.2	0.43	0.43			
199A:												
Plano-----------	0-12	18-27	1.10-1.30	0.60-2.00	0.22-0.24	Low------	3.0-5.0	0.32	0.32	5	6	48
	12-56	20-35	1.20-1.40	0.60-2.00	0.18-0.20	Moderate	0.2-1.0	0.43	0.43			
	56-70	15-32	1.30-1.55	0.60-6.00	0.09-0.16	Low------	0.1-0.5	0.37	0.37			
	70-80	5-20	1.50-1.70	2.00-6.00	0.11-0.22	Low------	0.1-0.5	0.37	0.37			
199B:												
Plano-----------	0-15	18-27	1.10-1.30	0.60-2.00	0.22-0.24	Low------	3.0-5.0	0.32	0.32	5	6	48
	15-54	20-35	1.20-1.40	0.60-2.00	0.18-0.20	Moderate	0.2-1.0	0.43	0.43			
	54-66	15-32	1.30-1.55	0.60-6.00	0.09-0.16	Low------	0.1-0.5	0.37	0.37			
	66-80	5-20	1.50-1.70	2.00-6.00	0.11-0.22	Low------	0.1-0.5	0.37	0.37			
223B2:												
Varna-----------	0-7	27-35	1.20-1.40	0.60-2.00	0.20-0.22	Moderate	2.0-3.0	0.32	0.32	5	7	---
	7-29	35-50	1.30-1.60	0.20-0.60	0.09-0.19	Moderate	0.5-1.0	0.32	0.32			
	29-80	27-40	1.65-1.90	0.06-0.60	0.01-0.09	Low------	0.2-0.5	0.37	0.43			
223C2:												
Varna-----------	0-8	27-35	1.20-1.40	0.60-2.00	0.20-0.22	Moderate	2.0-3.0	0.32	0.32	5	7	---
	8-33	35-50	1.30-1.60	0.20-0.60	0.09-0.19	Moderate	0.5-1.0	0.32	0.32			
	33-80	27-40	1.65-1.90	0.06-0.60	0.01-0.09	Low------	0.2-0.5	0.37	0.43			

Table 16.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors K	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
224D3:												
Strawn----------	0-6	27-30	1.35-1.55	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.37	0.37	5	7	---
	6-21	27-35	1.35-1.55	0.60-2.00	0.15-0.20	Moderate	0.2-1.0	0.37	0.43			
	21-80	22-30	1.50-1.70	0.20-0.60	0.08-0.12	Low------	0.2-0.5	0.32	0.32			
224E:												
Strawn----------	0-5	18-27	1.15-1.45	0.60-2.00	0.20-0.24	Low------	1.0-3.0	0.37	0.37	5	6	48
	5-20	27-35	1.35-1.55	0.60-2.00	0.15-0.20	Moderate	0.2-1.0	0.37	0.43			
	20-60	22-30	1.50-1.70	0.20-0.60	0.08-0.12	Low------	0.2-0.5	0.32	0.32			
233B:												
Birkbeck--------	0-7	15-27	1.30-1.50	0.60-2.00	0.22-0.25	Low------	1.0-3.0	0.37	0.37	5	6	48
	7-47	25-35	1.35-1.55	0.60-2.00	0.14-0.24	Moderate	0.5-1.0	0.37	0.37			
	47-55	20-35	1.35-1.60	0.20-0.60	0.10-0.18	Low------	0.0-0.5	0.37	0.43			
	55-60	17-30	1.55-1.90	0.20-0.60	0.05-0.19	Low------	0.0-0.5	0.37	0.43			
233B2:												
Birkbeck--------	0-8	27-35	1.35-1.55	0.60-2.00	0.14-0.19	Moderate	0.5-1.0	0.37	0.37	5	7	---
	8-49	25-35	1.35-1.55	0.60-2.00	0.14-0.24	Moderate	0.5-1.0	0.37	0.37			
	49-63	20-35	1.35-1.60	0.20-0.60	0.10-0.18	Low------	0.0-0.5	0.37	0.43			
	63-70	17-30	1.55-1.90	0.20-0.60	0.05-0.19	Low------	0.0-0.5	0.37	0.43			
233C2:												
Birkbeck--------	0-9	27-35	1.35-1.55	0.60-2.00	0.14-0.19	Moderate	0.5-1.0	0.37	0.37	5	7	---
	9-54	25-35	1.35-1.55	0.60-2.00	0.14-0.24	Moderate	0.5-1.0	0.37	0.37			
	54-60	20-35	1.35-1.60	0.20-0.60	0.10-0.18	Low------	0.0-0.5	0.37	0.43			
	60-70	17-30	1.55-1.90	0.20-0.60	0.05-0.19	Low------	0.0-0.5	0.37	0.43			
236A:												
Sabina----------	0-11	20-27	1.25-1.45	0.60-2.00	0.22-0.24	Low------	1.0-3.0	0.37	0.37	5	6	48
	11-52	35-42	1.35-1.55	0.20-0.60	0.11-0.20	High-----	0.0-1.0	0.37	0.37			
	52-80	20-35	1.50-1.75	0.20-0.60	0.11-0.18	Low------	0.0-1.0	0.32	0.32			
243B:												
St. Charles-----	0-12	20-27	1.15-1.30	0.60-2.00	0.22-0.24	Low------	1.0-3.0	0.37	0.37	5	6	48
	12-51	25-35	1.30-1.50	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.37	0.37			
	51-60	15-30	1.30-1.50	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.32	0.32			
244A:												
Hartsburg-------	0-17	27-33	1.15-1.35	0.60-2.00	0.21-0.24	Moderate	3.0-5.0	0.28	0.28	5	7	---
	17-49	27-35	1.20-1.50	0.60-2.00	0.18-0.20	Moderate	0.2-1.0	0.28	0.28			
	49-75	20-27	1.30-1.55	0.60-2.00	0.20-0.22	Low------	0.0-0.2	0.28	0.28			
257A:												
Clarksdale------	0-8	20-27	1.30-1.50	0.60-2.00	0.22-0.25	Moderate	2.0-3.0	0.37	0.37	5	6	48
	8-11	15-27	1.25-1.50	0.20-0.60	0.20-0.22	Low------	0.0-1.0	0.37	0.37			
	11-41	35-45	1.30-1.50	0.20-0.60	0.11-0.20	High-----	0.0-0.5	0.37	0.37			
	41-52	20-30	1.40-1.60	0.20-0.60	0.20-0.22	Moderate	0.0-0.5	0.37	0.37			
	52-80	18-27	1.40-1.60	0.20-0.60	0.20-0.22	Low------	0.0-0.5	0.37	0.37			
279B:												
Rozetta---------	0-7	15-27	1.20-1.40	0.60-2.00	0.22-0.24	Low------	0.5-2.0	0.37	0.37	5	6	48
	7-10	12-27	1.20-1.40	0.60-2.00	0.22-0.24	Low------	0.2-0.5	0.37	0.37			
	10-57	27-35	1.35-1.55	0.60-2.00	0.18-0.22	Moderate	0.2-0.5	0.37	0.37			
	57-80	20-30	1.40-1.60	0.60-2.00	0.20-0.22	Low------	0.2-0.5	0.37	0.37			
279B2:												
Rozetta---------	0-7	15-27	1.20-1.40	0.60-2.00	0.22-0.24	Low------	0.5-1.0	0.37	0.37	5	6	48
	7-52	27-35	1.35-1.55	0.60-2.00	0.18-0.22	Moderate	0.2-0.5	0.37	0.37			
	52-80	20-30	1.40-1.60	0.60-2.00	0.20-0.22	Low------	0.2-0.5	0.37	0.37			

Table 16.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors K	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
279C2:												
Rozetta---------	0-7	15-27	1.20-1.40	0.60-2.00	0.22-0.24	Low------	0.5-1.0	0.37	0.37	5	6	48
	7-33	27-35	1.35-1.55	0.60-2.00	0.18-0.22	Moderate	0.2-0.5	0.37	0.37			
	33-80	20-30	1.40-1.60	0.60-2.00	0.20-0.22	Low------	0.2-0.5	0.37	0.37			
280C2:												
Fayette---------	0-8	25-27	1.35-1.45	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.37	0.37	5	6	48
	8-54	25-35	1.30-1.45	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
	54-77	22-26	1.45-1.50	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
280D:												
Fayette---------	0-11	25-27	1.35-1.45	0.60-2.00	0.18-0.20	Moderate	1.0-2.0	0.37	0.37	5	6	48
	11-60	25-35	1.30-1.45	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
	60-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
356A:												
Elpaso----------	0-19	27-35	1.15-1.35	0.60-2.00	0.21-0.23	Moderate	5.0-7.0	0.28	0.28	5	7	---
	19-56	23-35	1.20-1.40	0.60-2.00	0.22-0.24	Moderate	0.2-0.5	0.32	0.32			
	56-61	15-30	1.30-1.50	0.60-2.00	0.18-0.22	Moderate	0.2-0.5	0.32	0.32			
	61-80	18-40	1.30-1.50	0.20-0.60	0.05-0.15	Moderate	0.2-0.5	0.32	0.32			
375A:												
Rutland---------	0-14	20-27	1.20-1.40	0.60-2.00	0.22-0.24	Moderate	4.0-5.0	0.28	0.28	5	6	48
	14-42	35-45	1.35-1.55	0.20-0.60	0.18-0.20	High-----	---	0.43	0.43			
	42-80	40-50	1.45-1.70	0.06-0.60	0.08-0.12	High-----	---	0.32	0.32			
375B2:												
Rutland---------	0-9	27-30	1.20-1.40	0.60-2.00	0.22-0.24	Moderate	3.0-4.0	0.28	0.28	5	7	---
	9-46	35-45	1.35-1.55	0.20-0.60	0.18-0.20	High-----	---	0.43	0.43			
	46-80	40-50	1.45-1.70	0.06-0.60	0.08-0.12	High-----	---	0.32	0.32			
379A:												
Dakota----------	0-14	14-27	1.40-1.50	0.60-2.00	0.20-0.22	Low------	2.0-5.0	0.24	0.24	4	5	56
	14-29	18-32	1.30-1.55	0.60-2.00	0.15-0.19	Low------	0.5-2.0	0.32	0.32			
	29-37	4-11	1.55-1.65	2.00-6.00	0.02-0.14	Low------	0.0-0.5	0.24	0.24			
	37-80	1-4	1.55-1.65	6.00-20.00	0.02-0.10	Low------	0.0-0.5	0.15	0.15			
379B:												
Dakota----------	0-10	14-27	1.40-1.50	0.60-2.00	0.20-0.22	Low------	2.0-5.0	0.24	0.24	4	5	56
	10-30	18-32	1.30-1.55	0.60-2.00	0.15-0.19	Low------	0.5-2.0	0.32	0.32			
	30-35	4-11	1.55-1.65	2.00-6.00	0.02-0.14	Low------	0.0-0.5	0.24	0.24			
	35-80	1-4	1.55-1.65	6.00-20.00	0.02-0.10	Low------	0.0-0.5	0.15	0.15			
383B:												
New Vienna------	0-8	18-27	1.25-1.30	0.60-2.00	0.21-0.23	Low------	2.0-3.0	0.32	0.32	5	6	48
	8-55	27-35	1.30-1.35	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.43	0.43			
	55-80	15-25	1.35-1.45	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
388B2:												
Wenona----------	0-9	20-27	1.10-1.30	0.20-0.60	0.22-0.24	Moderate	3.0-4.0	0.32	0.32	5	6	48
	9-40	35-42	1.35-1.55	0.20-0.60	0.13-0.18	High-----	0.2-1.0	0.32	0.32			
	40-80	40-45	1.45-1.70	0.06-0.20	0.05-0.08	High-----	0.2-0.5	0.32	0.32			
399A:												
Wea-------------	0-17	12-22	1.30-1.60	0.60-2.00	0.16-0.24	Low------	2.0-5.0	0.32	0.32	4	5	56
	17-29	20-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.5-2.0	0.32	0.43			
	29-51	18-30	1.50-1.70	0.60-2.00	0.07-0.16	Moderate	0.0-1.0	0.10	0.20			
	51-80	1-5	1.60-1.80	>20.00	0.02-0.04	Low------	0.0-1.0	0.02	0.05			

Table 16.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
399B:												
Wea-------------	0-14	12-22	1.30-1.60	0.60-2.00	0.16-0.24	Low------	2.0-5.0	0.32	0.32	4	5	56
	14-23	20-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.5-2.0	0.32	0.43			
	23-40	18-30	1.50-1.70	0.60-2.00	0.07-0.16	Moderate	0.0-1.0	0.10	0.20			
	40-80	1-5	1.60-1.80	>20.00	0.02-0.04	Low------	0.0-1.0	0.02	0.05			
435A:												
Streator--------	0-13	30-40	1.20-1.40	0.20-0.60	0.21-0.23	Moderate	5.0-6.0	0.28	0.28	5	7	---
	13-42	35-45	1.35-1.55	0.20-0.60	0.13-0.18	High-----	0.5-1.0	0.28	0.28			
	42-80	40-55	1.45-1.70	0.06-0.20	0.05-0.08	High-----	0.2-0.5	0.28	0.28			
484A:												
Harco-----------	0-15	20-30	1.20-1.35	0.60-2.00	0.22-0.24	Low------	3.0-5.0	0.32	0.32	5	6	48
	15-31	24-35	1.25-1.45	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.32	0.32			
	31-80	20-27	1.30-1.50	0.60-2.00	0.20-0.22	Low------	0.5-1.0	0.32	0.32			
536:												
Dumps, mine.												
541B2:												
Graymont--------	0-9	27-33	1.15-1.35	0.60-2.00	0.21-0.23	Moderate	1.0-3.0	0.32	0.32	4	7	---
	9-29	25-35	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	0.0-1.0	0.43	0.43			
	29-80	22-40	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.0-0.4	0.28	0.28			
541C2:												
Graymont--------	0-6	27-33	1.15-1.35	0.60-2.00	0.21-0.23	Moderate	1.0-3.0	0.32	0.32	4	7	---
	6-32	25-35	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	0.0-1.0	0.43	0.43			
	32-80	22-40	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.0-0.4	0.28	0.28			
549G:												
Marseilles------	0-2	20-27	1.20-1.40	0.60-2.00	0.22-0.24	Low------	1.0-3.0	0.37	0.37	3	6	48
	2-22	24-35	1.30-1.50	0.60-2.00	0.18-0.20	Moderate	0.5-1.0	0.37	0.37			
	22-38	25-42	1.35-1.60	0.06-0.20	0.09-0.20	Moderate	0.5-1.0	0.37	0.37			
	38-80	---	---	0.01-0.20	---	Low------	---	---	---			
567B:												
Elkhart---------	0-13	20-27	1.15-1.35	0.60-2.00	0.22-0.24	Low------	2.0-4.0	0.32	0.32	5	6	48
	13-30	25-35	1.25-1.45	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
	30-80	20-27	1.35-1.55	0.60-2.00	0.20-0.22	Low------	0.0-0.1	0.43	0.43			
567C2:												
Elkhart---------	0-8	27-35	1.20-1.40	0.60-2.00	0.20-0.22	Moderate	1.0-3.0	0.32	0.32	5	7	---
	8-34	25-35	1.25-1.45	0.60-2.00	0.18-0.20	Moderate	0.0-0.5	0.43	0.43			
	34-80	20-27	1.35-1.55	0.60-2.00	0.20-0.22	Low------	0.0-0.1	0.43	0.43			
570A:												
Martinsville----	0-8	8-20	1.30-1.60	0.60-2.00	0.18-0.24	Low------	1.0-3.0	0.28	0.32	5	5	56
	8-12	15-33	1.40-1.60	0.60-2.00	0.15-0.21	Moderate	0.0-1.0	0.28	0.32			
	12-46	20-33	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.28	0.32			
	46-62	15-25	1.40-1.65	0.60-2.00	0.10-0.19	Low------	0.0-0.5	0.20	0.24			
	62-80	5-20	1.50-1.70	0.60-2.00	0.08-0.17	Low------	0.0-0.5	0.28	0.32			
570C:												
Martinsville----	0-5	5-15	1.40-1.60	2.00-6.00	0.13-0.18	Low------	1.0-2.0	0.24	0.24	5	3	86
	5-9	15-33	1.40-1.60	0.60-2.00	0.15-0.21	Moderate	0.0-1.0	0.28	0.32			
	9-23	20-33	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.28	0.32			
	23-56	15-25	1.40-1.65	0.60-2.00	0.10-0.19	Low------	0.0-0.5	0.20	0.24			
	56-60	5-20	1.50-1.70	0.60-2.00	0.08-0.17	Low------	0.0-0.5	0.28	0.32			

Table 16.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors K	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
614A:												
Chenoa----------	0-13	20-27	1.10-1.30	0.60-2.00	0.21-0.23	Moderate	4.0-5.0	0.28	0.28	4	7	---
	13-36	27-45	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	0.0-1.0	0.43	0.43			
	36-43	25-40	1.50-1.75	0.06-0.20	0.12-0.20	Moderate	0.0-0.5	0.28	0.32			
	43-80	25-40	1.50-1.75	0.06-0.20	0.14-0.20	Moderate	0.0-0.5	0.28	0.32			
618D2:												
Senachwine------	0-5	11-22	1.20-1.65	0.60-2.00	0.17-0.26	Low------	0.5-2.0	0.37	0.37	4	5	56
	5-32	27-35	1.40-1.70	0.60-2.00	0.07-0.21	Moderate	0.0-0.5	0.37	0.37			
	32-37	15-25	1.60-1.80	0.20-0.60	0.07-0.17	Low------	0.0-0.5	0.37	0.43			
	37-80	10-20	1.75-1.95	0.20-0.60	0.07-0.17	Low------	0.0-0.5	0.37	0.43			
618E:												
Senachwine------	0-11	18-27	1.20-1.65	0.60-2.00	0.17-0.26	Low------	0.5-2.0	0.37	0.37	4	5	56
	11-28	27-35	1.40-1.70	0.60-2.00	0.07-0.21	Moderate	0.0-0.5	0.37	0.37			
	28-44	15-25	1.60-1.80	0.20-0.60	0.07-0.17	Low------	0.0-0.5	0.37	0.43			
	44-80	10-20	1.75-1.95	0.20-0.60	0.07-0.17	Low------	0.0-0.5	0.37	0.43			
802B:												
Orthents--------	0-3	22-30	1.70-1.75	0.20-0.60	0.18-0.22	Moderate	0.5-2.0	0.43	0.43	5	4	86
	3-60	22-30	1.70-1.80	0.20-0.60	0.16-0.20	Moderate	0.2-1.0	0.43	0.43			
865:												
Pits, gravel.												
883F:												
Senachwine------	0-6	11-22	1.20-1.65	0.60-2.00	0.17-0.26	Low------	1.0-3.0	0.37	0.37	4	5	56
	6-39	27-35	1.40-1.70	0.60-2.00	0.07-0.21	Moderate	0.0-0.5	0.37	0.37			
	39-60	10-20	1.75-1.95	0.20-0.60	0.01-0.03	Low------	0.0-0.5	0.37	0.43			
Hennepin--------	0-6	20-30	1.20-1.40	0.60-2.00	0.18-0.24	Low------	1.0-2.0	0.28	---	5	6	48
	6-11	18-30	1.30-1.60	0.20-0.60	0.14-0.22	Low------	0.0-0.5	0.32	0.32			
	11-60	18-30	1.70-1.85	0.20-0.60	0.10-0.15	Low------	0.0-0.5	0.32	0.32			
3028A:												
Jules-----------	0-8	10-20	1.15-1.40	0.60-2.00	0.20-0.24	Low------	1.0-2.0	0.37	0.37	5	4L	86
	8-60	10-18	1.20-1.50	0.60-2.00	0.17-0.22	Low------	0.0-0.5	0.37	0.37			
3360L:												
Slacwater-------	0-6	15-30	1.35-1.65	0.60-2.00	0.20-0.24	Low------	1.0-2.0	0.32	0.32	5	4L	86
	6-60	8-35	1.35-1.55	0.60-2.00	0.17-0.20	Low------	0.0-0.5	0.32	0.32			
3480L:												
Moundprairie----	0-10	28-35	1.30-1.40	0.60-2.00	0.18-0.22	Moderate	2.0-3.0	0.32	0.32	5	4L	86
	10-48	18-35	1.35-1.45	0.60-2.00	0.18-0.22	Moderate	---	0.32	0.32			
	48-80	15-35	1.35-1.50	0.60-2.00	0.16-0.22	Moderate	---	0.32	0.32			
7081A:												
Littleton-------	0-7	18-27	1.20-1.45	0.60-2.00	0.20-0.24	Low------	3.0-4.0	0.32	0.32	5	6	48
	7-26	22-27	1.20-1.40	0.60-2.00	0.22-0.24	Low------	---	0.32	0.32			
	26-60	18-27	1.20-1.40	0.60-2.00	0.20-0.22	Low------	---	0.43	0.43			
7304B:												
Landes----------	0-13	10-22	1.20-1.40	0.60-6.00	0.20-0.22	Low------	1.0-2.0	0.32	0.32	4	5	56
	13-38	5-18	1.60-1.70	2.00-6.00	0.10-0.15	Low------	0.0-2.0	0.24	0.24			
	38-60	5-18	1.60-1.80	6.00-20.00	0.05-0.15	Low------	0.0-2.0	0.15	0.15			
8073A:												
Ross------------	0-36	15-27	1.20-1.45	0.60-2.00	0.19-0.24	Low------	3.0-5.0	0.32	0.32	5	5	56
	36-54	18-32	1.20-1.50	0.60-2.00	0.16-0.22	Low------	1.0-3.0	0.32	0.32			
	54-80	5-25	1.35-1.60	0.60-6.00	0.05-0.18	Low------	0.5-2.0	0.32	0.49			

Table 16.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors K	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
8074A:												
Radford---------	0-7	18-27	1.40-1.60	0.60-2.00	0.22-0.24	Low------	2.0-4.0	0.28	0.28	5	6	48
	7-35	18-27	1.40-1.60	0.60-2.00	0.20-0.22	Low------	0.0-2.0	0.28	0.28			
	35-80	24-35	1.35-1.55	0.60-2.00	0.18-0.20	Moderate	0.0-1.0	0.28	0.28			
8107A:												
Sawmill---------	0-19	27-35	1.20-1.40	0.60-2.00	0.21-0.23	Moderate	4.0-5.0	0.28	0.28	5	7	---
	19-33	27-35	1.20-1.40	0.60-2.00	0.21-0.23	Moderate	1.0-3.0	0.28	0.28			
	33-60	25-35	1.30-1.45	0.60-2.00	0.17-0.20	Moderate	0.0-2.0	0.28	0.28			
	60-80	18-35	1.35-1.50	0.60-2.00	0.15-0.19	Moderate	0.0-1.0	0.28	0.28			
8304A:												
Landes----------	0-20	7-20	1.40-1.60	2.00-6.00	0.13-0.20	Low------	1.0-2.0	0.20	0.20	4	3	86
	20-43	5-18	1.60-1.70	2.00-6.00	0.10-0.15	Low------	0.0-2.0	0.24	0.24			
	43-80	5-18	1.60-1.80	6.00-20.00	0.05-0.15	Low------	0.0-2.0	0.15	0.15			
8368A:												
Raveenwash------	0-5	5-20	1.15-1.40	0.60-6.00	0.20-0.24	Low------	0.5-2.0	0.28	0.28	5	4L	86
	5-80	3-18	1.50-1.70	2.00-20.00	0.12-0.19	Low------	0.2-0.5	0.28	0.28			

Table 17.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
17A:					
Keomah----------	0-10	16-26	15.0-20.0	4.5-7.3	---
	10-13	16-26	15.0-20.0	4.5-7.3	---
	13-23	35-42	25.0-30.0	4.5-5.5	---
	23-80	24-38	15.0-20.0	5.1-7.3	---
17B2:					
Keomah----------	0-6	16-26	15.0-20.0	4.5-7.3	---
	6-16	35-42	25.0-30.0	4.5-5.5	---
	16-80	24-38	15.0-20.0	5.1-7.3	---
19C3:					
Sylvan----------	0-9	27-32	17.0-21.0	5.6-7.3	---
	9-20	25-35	15.0-22.0	5.6-7.3	---
	20-80	10-27	6.0-18.0	6.6-8.4	0-35
19D3:					
Sylvan----------	0-5	27-32	17.0-21.0	5.6-7.3	---
	5-30	25-35	15.0-22.0	5.6-7.3	---
	30-80	10-27	6.0-18.0	6.6-8.4	0-35
24C2:					
Dodge-----------	0-6	10-20	---	5.1-7.3	---
	6-32	25-32	---	5.1-6.5	---
	32-38	15-32	---	6.1-7.8	---
	38-80	10-25	---	7.4-8.4	---
24D2:					
Dodge-----------	0-6	10-20	---	5.1-7.3	---
	6-32	25-32	---	5.1-6.5	---
	32-38	15-32	---	6.1-7.8	---
	38-80	10-25	---	7.4-8.4	---
25G:					
Hennepin--------	0-3	20-30	14.0-22.0	6.1-7.8	0-20
	3-16	18-30	11.0-19.0	6.1-8.4	0-40
	16-80	18-30	11.0-18.0	7.4-8.4	10-45
37B:					
Worthen---------	0-24	12-22	15.0-21.0	5.6-7.3	---
	24-60	15-26	11.0-14.0	5.6-7.8	---
43A:					
Ipava-----------	0-8	20-27	20.0-27.0	5.6-7.3	---
	8-49	35-43	22.0-27.0	5.6-7.8	---
	49-80	20-30	12.0-19.0	6.1-8.4	---
51A:					
Muscatune-------	0-17	24-27	30.0-36.0	5.1-7.3	---
	17-46	30-35	30.0-36.0	5.1-7.3	---
	46-80	22-30	30.0-36.0	6.6-7.8	0-15
60C2:					
La Rose---------	0-7	27-35	17.0-23.0	6.1-7.8	---
	7-17	27-35	16.0-22.0	6.6-7.8	0-20
	17-80	15-25	11.0-17.0	7.4-8.4	15-40

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
60D2:					
La Rose---------	0-6	18-27	15.0-24.0	6.1-7.8	---
	6-18	27-35	16.0-22.0	6.6-7.8	0-20
	18-60	15-25	11.0-17.0	7.4-8.4	15-40
68A:					
Sable-----------	0-14	27-35	26.0-33.0	5.6-7.3	---
	14-50	24-35	15.0-23.0	5.6-7.8	---
	50-80	20-28	12.0-18.0	6.6-8.4	0-30
86B:					
Osco------------	0-11	20-26	18.0-25.0	5.1-7.3	---
	11-43	24-35	15.0-23.0	5.1-6.5	---
	43-80	20-30	12.0-18.0	5.6-7.3	---
86B2:					
Osco------------	0-9	27-35	18.0-25.0	5.1-7.3	---
	9-39	24-35	15.0-23.0	5.1-6.5	---
	39-80	20-30	12.0-18.0	5.6-7.3	---
86C2:					
Osco------------	0-5	27-35	18.0-25.0	5.1-7.3	---
	5-45	24-35	15.0-23.0	5.1-6.5	---
	45-80	20-30	12.0-18.0	5.6-7.3	---
88C2:					
Sparta----------	0-9	3-10	2.0-12.0	5.1-7.3	---
	9-36	1-8	1.0-6.0	5.1-7.3	---
	36-80	0-5	1.0-4.0	5.1-7.8	---
91B2:					
Swygert---------	0-8	27-40	25.0-30.0	5.6-7.3	---
	8-15	30-45	20.0-30.0	5.6-7.3	---
	15-45	45-50	15.0-25.0	5.6-8.4	0-5
	45-80	38-60	20.0-30.0	7.4-8.4	20-30
93G:					
Rodman----------	0-7	8-25	5.0-18.0	6.6-7.8	0-15
	7-13	5-25	1.0-14.0	6.6-7.8	0-25
	13-80	0-10	1.0-6.0	7.4-8.4	10-45
145B2:					
Saybrook--------	0-8	27-29	18.0-24.0	5.6-7.3	---
	8-27	25-35	17.0-23.0	5.6-7.3	---
	27-80	24-35	14.0-22.0	5.6-8.4	0-30
145C2:					
Saybrook--------	0-8	27-29	18.0-24.0	5.6-7.3	---
	8-30	25-35	17.0-23.0	5.6-7.3	---
	30-59	24-35	14.0-22.0	5.6-8.4	0-30
	59-80	24-35	14.0-22.0	5.6-8.4	0-30
148B:					
Proctor---------	0-12	18-27	15.0-24.0	5.1-7.8	---
	12-29	25-35	16.0-25.0	5.6-7.3	---
	29-35	22-35	15.0-23.0	5.6-7.3	---
	35-60	10-20	4.0-12.0	6.1-7.8	0-10
150A:					
Onarga----------	0-12	8-15	---	5.6-7.8	---
	12-48	15-18	---	4.5-7.3	---
	48-80	2-10	---	5.1-7.3	---

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
150C:					
Onarga----------	0-10	8-15	---	5.6-7.8	---
	10-30	15-18	---	4.5-7.3	---
	30-80	2-10	---	5.1-7.3	---
152A:					
Drummer---------	0-14	27-35	22.0-30.0	5.6-7.3	---
	14-53	20-35	12.0-23.0	5.6-7.8	---
	53-60	10-32	9.0-19.0	6.6-8.4	0-40
154A:					
Flanagan--------	0-13	20-27	20.0-26.0	5.1-7.3	---
	13-42	25-42	21.0-26.0	5.6-7.3	---
	42-80	20-30	12.0-18.0	6.1-8.4	0-26
171B:					
Catlin----------	0-16	18-27	17.0-24.0	5.1-7.3	---
	16-46	27-35	16.0-23.0	5.1-7.3	---
	46-80	20-30	12.0-19.0	6.1-8.4	0-20
171B2:					
Catlin----------	0-9	18-27	17.0-24.0	5.1-7.3	---
	9-49	27-35	16.0-23.0	5.1-7.3	---
	49-80	20-30	12.0-19.0	6.1-8.4	0-20
171C2:					
Catlin----------	0-9	27-35	17.0-24.0	5.1-7.3	---
	9-43	27-35	16.0-23.0	5.1-7.3	---
	43-80	20-30	12.0-19.0	6.1-8.4	0-20
194F:					
Morley----------	0-7	22-27	15.0-22.0	5.1-6.5	---
	7-18	27-40	16.0-24.0	5.1-6.5	---
	18-37	35-50	21.0-30.0	6.1-8.4	0-20
	37-60	27-40	16.0-24.0	6.1-8.4	0-25
198A:					
Elburn----------	0-13	22-27	20.0-30.0	5.6-7.3	---
	13-50	25-35	15.0-25.0	5.6-7.3	---
	50-80	15-30	9.0-15.0	6.1-8.4	0-20
199A:					
Plano-----------	0-12	18-27	17.0-26.0	6.1-7.3	---
	12-56	20-35	15.0-23.0	5.1-7.3	---
	56-70	15-32	9.0-20.0	5.6-7.8	---
	70-80	5-20	6.0-13.0	5.6-8.4	0-20
199B:					
Plano-----------	0-15	18-27	17.0-26.0	6.1-7.3	---
	15-54	20-35	15.0-23.0	5.1-7.3	---
	54-66	15-32	9.0-20.0	5.6-7.8	---
	66-80	5-20	6.0-13.0	5.6-8.4	0-20
223B2:					
Varna-----------	0-7	27-35	20.0-27.0	5.6-7.8	---
	7-29	35-50	22.0-30.0	5.6-7.8	0-15
	29-80	27-40	16.0-25.0	6.6-8.4	5-30
223C2:					
Varna-----------	0-8	27-35	20.0-27.0	5.6-7.8	---
	8-33	35-50	22.0-30.0	5.6-7.8	0-15
	33-80	27-40	16.0-25.0	6.6-8.4	5-30

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
224D3:					
Strawn----------	0-6	27-30	18.0-22.0	5.6-7.3	---
	6-21	27-35	16.0-23.0	5.6-7.8	---
	21-80	22-30	12.0-19.0	7.4-8.4	5-30
224E:					
Strawn----------	0-5	18-27	13.0-22.0	6.1-7.3	---
	5-20	27-35	16.0-23.0	5.6-7.8	---
	20-60	22-30	12.0-19.0	7.4-8.4	5-30
233B:					
Birkbeck--------	0-7	15-27	11.0-23.0	5.1-7.3	---
	7-47	25-35	16.0-23.0	4.5-7.3	---
	47-55	20-35	12.0-19.0	5.6-7.8	0-5
	55-60	17-30	10.0-19.0	6.6-8.4	0-20
233B2:					
Birkbeck--------	0-8	27-35	17.0-23.0	5.1-7.3	---
	8-49	25-35	16.0-23.0	4.5-7.3	---
	49-63	20-35	12.0-19.0	5.6-7.8	0-5
	63-70	17-30	10.0-19.0	6.6-8.4	0-20
233C2:					
Birkbeck--------	0-9	27-35	17.0-23.0	5.1-7.3	---
	9-54	25-35	16.0-23.0	4.5-7.3	---
	54-60	20-35	12.0-19.0	5.6-7.8	0-5
	60-70	17-30	10.0-19.0	6.6-8.4	0-20
236A:					
Sabina----------	0-11	20-27	14.0-22.0	5.1-7.3	---
	11-52	35-42	21.0-27.0	5.6-7.3	---
	52-80	20-35	12.0-23.0	6.6-7.8	0-20
243B:					
St. Charles-----	0-12	20-27	14.0-22.0	5.1-7.8	---
	12-51	25-35	15.0-22.0	4.5-7.3	---
	51-60	15-30	9.0-19.0	5.1-7.3	---
244A:					
Hartsburg-------	0-17	27-33	22.0-31.0	6.1-7.8	0-5
	17-49	27-35	16.0-23.0	6.6-8.4	0-30
	49-75	20-27	12.0-16.0	7.4-8.4	10-40
257A:					
Clarksdale------	0-8	20-27	10.0-22.0	5.1-7.3	---
	8-11	15-27	9.0-18.0	5.1-6.5	---
	11-41	35-45	21.0-28.0	5.1-7.3	---
	41-52	20-30	12.0-19.0	6.1-8.4	0-15
	52-80	18-27	12.0-18.0	6.1-8.4	0-15
279B:					
Rozetta---------	0-7	15-27	10.0-22.0	5.1-7.3	---
	7-10	12-27	7.0-17.0	4.5-7.3	---
	10-57	27-35	16.0-22.0	4.5-6.0	---
	57-80	20-30	12.0-17.0	5.6-7.8	0-15
279B2:					
Rozetta---------	0-7	15-27	10.0-22.0	5.1-7.3	---
	7-52	27-35	16.0-22.0	4.5-6.0	---
	52-80	20-30	12.0-17.0	5.6-7.8	0-15

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
279C2:					
Rozetta---------	0-7	15-27	10.0-22.0	5.1-7.3	---
	7-33	27-35	16.0-22.0	4.5-6.0	---
	33-80	20-30	12.0-17.0	5.6-7.8	0-15
280C2:					
Fayette---------	0-8	25-27	18.0-25.0	5.1-7.3	---
	8-54	25-35	15.0-20.0	4.5-6.0	---
	54-77	22-26	15.0-20.0	5.1-7.8	0-15
280D:					
Fayette---------	0-11	25-27	18.0-25.0	5.1-7.3	---
	11-60	25-35	15.0-20.0	4.5-6.0	---
	60-80	22-26	15.0-20.0	5.1-7.8	0-15
356A:					
Elpaso----------	0-19	27-35	25.0-30.0	5.6-7.3	---
	19-56	23-35	14.0-20.0	6.1-7.3	0-10
	56-61	15-30	10.0-20.0	6.6-7.8	0-30
	61-80	18-40	10.0-25.0	6.6-8.4	---
375A:					
Rutland---------	0-14	20-27	---	5.6-7.3	---
	14-42	35-45	---	5.1-8.4	---
	42-80	40-50	---	6.6-8.4	---
375B2:					
Rutland---------	0-9	27-30	---	5.6-7.3	---
	9-46	35-45	---	5.1-8.4	---
	46-80	40-50	---	6.6-8.4	---
379A:					
Dakota----------	0-14	14-27	7.0-30.0	5.1-7.3	---
	14-29	18-32	5.0-30.0	5.1-7.3	---
	29-37	4-11	1.0-10.0	5.1-7.3	---
	37-80	1-4	0.0-4.0	5.1-7.8	0-15
379B:					
Dakota----------	0-10	14-27	7.0-30.0	5.1-7.3	---
	10-30	18-32	5.0-30.0	5.1-7.3	---
	30-35	4-11	1.0-10.0	5.1-7.3	---
	35-80	1-4	0.0-4.0	5.1-7.8	0-15
383B:					
New Vienna------	0-8	18-27	20.0-25.0	5.1-7.3	---
	8-55	27-35	25.0-30.0	5.1-6.5	---
	55-80	15-25	20.0-25.0	5.1-6.5	---
388B2:					
Wenona----------	0-9	20-27	18.0-24.0	5.1-6.5	---
	9-40	35-42	21.0-26.0	5.1-6.5	---
	40-80	40-45	24.0-28.0	7.4-8.4	5-30
399A:					
Wea-------------	0-17	12-22	8.0-24.0	5.6-7.3	---
	17-29	20-32	9.0-24.0	5.1-6.5	---
	29-51	18-30	7.0-20.0	5.6-7.3	---
	51-80	1-5	0.0-5.0	7.4-8.4	20-55

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
399B:					
Wea-------------	0-14	12-22	8.0-24.0	5.6-7.3	---
	14-23	20-32	9.0-24.0	5.1-6.5	---
	23-40	18-30	7.0-20.0	5.6-7.3	---
	40-80	1-5	0.0-5.0	7.4-8.4	20-55
435A:					
Streator--------	0-13	30-40	28.0-36.0	6.1-7.8	---
	13-42	35-45	22.0-29.0	6.1-7.8	0-5
	42-80	40-55	24.0-34.0	7.4-8.4	0-20
484A:					
Harco-----------	0-15	20-30	18.0-26.0	6.1-7.3	---
	15-31	24-35	15.0-23.0	6.1-7.3	---
	31-80	20-27	13.0-18.0	7.4-8.4	0-25
536:					
Dumps, mine.					
541B2:					
Graymont--------	0-9	27-33	24.0-29.0	6.1-7.3	---
	9-29	25-35	16.0-27.0	5.6-7.3	---
	29-80	22-40	10.0-24.0	6.6-8.4	5-30
541C2:					
Graymont--------	0-6	27-33	24.0-29.0	6.1-7.3	---
	6-32	25-35	16.0-27.0	5.6-7.3	---
	32-80	22-40	10.0-24.0	6.6-8.4	5-30
549G:					
Marseilles------	0-2	20-27	14.0-22.0	5.1-7.3	---
	2-22	24-35	15.0-23.0	5.6-6.5	---
	22-38	25-42	15.0-25.0	4.5-6.5	---
	38-80	---	---	---	---
567B:					
Elkhart---------	0-13	20-27	16.0-24.0	5.6-7.8	---
	13-30	25-35	15.0-22.0	5.6-8.4	0-20
	30-80	20-27	12.0-21.0	7.4-8.4	10-40
567C2:					
Elkhart---------	0-8	27-35	18.0-27.0	5.6-7.8	---
	8-34	25-35	15.0-22.0	5.6-8.4	0-20
	34-80	20-27	12.0-21.0	7.4-8.4	10-40
570A:					
Martinsville----	0-8	8-20	5.0-16.0	5.1-7.3	---
	8-12	15-33	6.0-17.0	5.1-7.3	---
	12-46	20-33	8.0-17.0	5.1-7.3	---
	46-62	15-25	2.0-12.0	5.6-7.8	0-10
	62-80	5-20	1.0-10.0	7.4-8.4	10-40
570C:					
Martinsville----	0-5	5-15	4.0-13.0	5.1-7.3	---
	5-9	15-33	6.0-17.0	5.1-7.3	---
	9-23	20-33	8.0-17.0	5.1-7.3	---
	23-56	15-25	2.0-12.0	5.6-7.8	0-10
	56-60	5-20	1.0-10.0	7.4-8.4	10-40

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
614A:					
Chenoa----------	0-13	20-27	24.0-29.0	5.6-7.3	---
	13-36	27-45	16.0-29.0	5.6-7.3	---
	36-43	25-40	15.0-25.0	6.1-7.8	0-10
	43-80	25-40	15.0-25.0	7.4-8.4	5-40
618D2:					
Senachwine------	0-5	11-22	7.0-17.0	5.6-7.3	---
	5-32	27-35	9.0-20.0	5.1-7.3	---
	32-37	15-25	4.0-11.0	6.6-7.8	0-20
	37-80	10-20	2.0-9.0	7.4-8.4	20-45
618E:					
Senachwine------	0-11	18-27	7.0-17.0	5.6-7.3	---
	11-28	27-35	9.0-20.0	5.1-7.3	---
	28-44	15-25	4.0-11.0	6.6-7.8	0-20
	44-80	10-20	2.0-9.0	7.4-8.4	20-45
802B:					
Orthents--------	0-3	22-30	10.0-25.0	5.6-7.8	0-10
	3-60	22-30	10.0-20.0	5.6-7.8	0-20
865:					
Pits, gravel.					
883F:					
Senachwine------	0-6	11-22	7.0-17.0	5.6-7.3	---
	6-39	27-35	9.0-20.0	5.1-7.3	---
	39-60	10-20	2.0-9.0	7.4-8.4	20-45
Hennepin--------	0-6	20-30	14.0-22.0	6.1-7.8	0-20
	6-11	18-30	11.0-19.0	6.1-8.4	0-40
	11-60	18-30	11.0-18.0	7.4-8.4	10-45
3028A:					
Jules-----------	0-8	10-20	8.0-16.0	7.4-8.4	15-35
	8-60	10-18	5.0-12.0	7.4-8.4	15-40
3360L:					
Slacwater-------	0-6	15-30	10.0-20.0	7.4-8.4	0-10
	6-60	8-35	5.0-22.0	7.4-8.4	0-30
3480L:					
Moundprairie----	0-10	28-35	---	7.4-7.8	---
	10-48	18-35	---	7.4-7.8	---
	48-80	15-35	---	6.6-7.8	---
7081A:					
Littleton-------	0-7	18-27	---	5.6-7.8	---
	7-26	22-27	---	5.6-7.8	---
	26-60	18-27	---	5.6-7.8	---
7304B:					
Landes----------	0-13	10-22	8.0-17.0	5.6-8.4	---
	13-38	5-18	3.0-15.0	5.6-8.4	0-10
	38-60	5-18	3.0-15.0	5.6-8.4	0-20
8073A:					
Ross------------	0-36	15-27	12.0-26.0	6.1-7.8	---
	36-54	18-32	8.0-20.0	6.1-8.4	0-20
	54-80	5-25	2.0-15.0	6.1-8.4	0-30

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
8074A:					
Radford---------	0-7	18-27	13.0-22.0	5.6-7.8	---
	7-35	18-27	10.0-16.0	6.1-7.8	---
	35-80	24-35	12.0-19.0	6.6-7.8	---
8107A:					
Sawmill---------	0-19	27-35	24.0-31.0	6.1-7.8	---
	19-33	27-35	17.0-27.0	6.1-7.8	---
	33-60	25-35	16.0-25.0	6.1-7.8	0-10
	60-80	18-35	11.0-22.0	6.1-8.4	0-30
8304A:					
Landes----------	0-20	7-20	6.0-16.0	5.6-8.4	---
	20-43	5-18	3.0-15.0	5.6-8.4	0-10
	43-80	5-18	3.0-15.0	5.6-8.4	0-20
8368A:					
Raveenwash------	0-5	5-20	4.0-16.0	7.4-8.4	0-10
	5-80	3-18	2.0-12.0	7.4-8.4	0-30

Table 18.--Water Features

(Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table and ponding: Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
17A, 17B2:									
Keomah----------	C	---	---	---	0.5-1.0	Apparent---	Dec-Jun	---	---
19C3, 19D3:									
Sylvan----------	B	---	---	---	>6.0	---	---	---	---
24C2, 24D2:									
Dodge-----------	B	---	---	---	4.0-6.0	Apparent---	Mar-Jun	---	---
25G:									
Hennepin--------	B	---	---	---	4.0-6.0	Apparent---	Mar-Jun	---	---
37B:									
Worthen---------	B	---	---	---	4.0-6.0	Apparent---	Mar-Jun	---	---
43A:									
Ipava-----------	B	---	---	---	1.0-2.0	Apparent---	Feb-Jun	---	---
51A:									
Muscatune-------	B	---	---	---	1.0-2.0	Apparent---	Feb-Jun	---	---
60C2, 60D2:									
La Rose---------	B	---	---	---	4.0-6.0	Apparent---	Feb-Jun	---	---
68A:									
Sable-----------	B/D	---	---	---	0.0-1.0	Apparent---	Nov-Jul	Brief-----	0.5
86B, 86B2:									
Osco------------	B	---	---	---	2.0-4.0	Apparent---	Feb-Jun	---	---
86C2:									
Osco------------	B	---	---	---	4.0-6.0	Apparent---	Mar-May	---	---
88C2:									
Sparta----------	A	---	---	---	>6.0	---	---	---	---
91B2:									
Swygert---------	C	---	---	---	1.0-2.0	Perched----	Feb-May	---	---
93G:									
Rodman----------	A	---	---	---	>6.0	---	---	---	---
145B2, 145C2:									
Saybrook--------	B	---	---	---	2.0-4.0	Perched----	Mar-Jun	---	---
148B:									
Proctor---------	B	---	---	---	4.0-6.0	Apparent---	Mar-Jun	---	---
150A, 150C:									
Onarga----------	B	---	---	---	>6.0	---	---	---	---
152A:									
Drummer---------	B	---	---	---	0.0-1.0	Apparent---	Nov-Jul	Brief-----	0.5
154A:									
Flanagan--------	B	---	---	---	1.0-2.0	Apparent---	Mar-Jun	---	---

Table 18.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
171B, 171B2, 171C2: Catlin	B	---	---	---	2.0-4.0	Apparent	Feb-May	---	---
194F: Morley	C	---	---	---	4.0-6.0	Perched	Feb-May	---	---
198A: Elburn	B	---	---	---	4.0-6.0	Apparent	Mar-Jun	---	---
199A, 199B: Plano	B	---	---	---	4.0-6.0	Apparent	Mar-Jun	---	---
223B2, 223C2: Varna	C	---	---	---	2.0-4.0	Perched	Feb-Jun	---	---
224D3, 224E: Strawn	B	---	---	---	4.0-6.0	Apparent	Mar-Jun	---	---
233B, 233B2, 233C2: Birkbeck	B	---	---	---	2.0-4.0	Apparent	Mar-May	---	---
236A: Sabina	C	---	---	---	1.0-2.0	Apparent	Mar-Jun	---	---
243B: St. Charles	B	---	---	---	4.0-6.0	Apparent	Mar-Jun	---	---
244A: Hartsburg	B/D	---	---	---	0.0-1.0	Apparent	Nov-Jul	Brief	0.5
257A: Clarksdale	C	---	---	---	1.0-2.0	Apparent	Mar-Jun	---	---
279B, 279B2: Rozetta	B	---	---	---	2.0-4.0	Apparent	Mar-Jun	---	---
279C2: Rozetta	B	---	---	---	4.0-6.0	Apparent	Mar-May	---	---
280C2, 280D: Fayette	B	---	---	---	>6.0	---	---	---	---
356A: Elpaso	B/D	---	---	---	0.0-1.0	Apparent	Nov-Jul	---	---
375A, 375B2: Rutland	C	---	---	---	1.0-2.0	Apparent	Mar-May	---	---
379A, 379B: Dakota	B	---	---	---	>6.0	---	---	---	---
383B: New Vienna	B	---	---	---	2.0-4.0	Apparent	Mar-Jun	---	---
388B2: Wenona	C	---	---	---	2.0-4.0	Perched	Mar-Jun	---	---
399A, 399B: Wea	B	---	---	---	>6.0	---	---	---	---

Table 18.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table and ponding: Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
435A:									
Streator	B/D	---	---	---	0.0-1.0	Apparent	Mar-Jun	Brief	0.5
484A:									
Harco	B	---	---	---	1.0-2.0	Apparent	Feb-Apr	---	---
536:									
Dumps, mine.									
541B2:									
Graymont	B	---	---	---	2.0-4.0	Perched	Mar-Jun	---	---
541C2:									
Graymont	B	---	---	---	2.0-4.0	Perched	Mar-May	---	---
549G:									
Marseilles	B	---	---	---	4.0-6.0	Perched	Mar-May	---	---
567B:									
Elkhart	B	---	---	---	2.0-4.0	Apparent	Mar-May	---	---
567C2:									
Elkhart	B	---	---	---	4.0-6.0	Apparent	Mar-May	---	---
570A, 570C:									
Martinsville	B	---	---	---	4.0-6.0	Apparent	Mar-Jun	---	---
614A:									
Chenoa	B	---	---	---	1.0-2.0	Apparent	Feb-Jun	---	---
618D2, 618E:									
Senachwine	B	---	---	---	4.0-6.0	Perched	Mar-Jun	---	---
802B:									
Orthents	B	---	---	---	>6.0	---	---	---	---
865:									
Pits, gravel.									
883F:									
Senachwine	B	---	---	---	4.0-6.0	Apparent	Mar-Jun	---	---
Hennepin	B	---	---	---	4.0-6.0	Apparent	Mar-Jun	---	---
3028A:									
Jules	B	Frequent	Brief	Mar-Jun	4.0-6.0	Apparent	Mar-Jun	---	---
3360L:									
Slacwater	B/D	Frequent	Very long	Oct-Jun	0.0-1.0	Apparent	Nov-Jul	Brief	0.5
3480L:									
Moundprairie	B/D	Frequent	Very long	Oct-Jun	0.0-1.0	Apparent	Mar-Nov	Brief	0.5
7081A:									
Littleton	B	Rare	Brief	Mar-May	1.0-2.0	Apparent	Apr-Jun	---	---
7304B:									
Landes	B	Rare	Brief	Mar-May	4.0-6.0	Apparent	Mar-Jun	---	---
8073A:									
Ross	B	Occasional	Brief	Oct-Jun	4.0-6.0	Apparent	Feb-Apr	---	---

Table 18.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table and ponding: Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
8074A:									
Radford---------	B	Occasional	Brief-----	Oct-Jun	1.0-2.0	Apparent---	Mar-Jun	---	---
8107A:									
Sawmill---------	B/D	Occasional	Brief-----	Oct-Jun	0.0-1.0	Apparent---	Mar-Jun	---	---
8304A:									
Landes----------	B	Occasional	Brief-----	Oct-Jun	>6.0	---	---	---	---
8368A:									
Raveenwash------	A	Occasional	Long------	Oct-Jun	1.0-2.0	Apparent---	Nov-Jun	---	---

Table 19.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
17A, 17B2:					
Keomah	---	---	High	High	Moderate.
19C3, 19D3:					
Sylvan	---	---	High	Moderate	Moderate.
24C2, 24D2:					
Dodge	---	---	High	Moderate	Moderate.
25G:					
Hennepin	---	---	Moderate	Low	Low.
37B:					
Worthen	---	---	High	Low	Low.
43A:					
Ipava	---	---	High	High	Moderate.
51A:					
Muscatune	---	---	High	High	Moderate.
60C2, 60D2:					
La Rose	---	---	Moderate	Moderate	Low.
68A:					
Sable	---	---	High	High	Low.
86B, 86B2, 86C2:					
Osco	---	---	High	Moderate	Moderate.
88C2:					
Sparta	---	---	Low	Low	Moderate.
91B2:					
Swygert	---	---	High	High	Low.
93G:					
Rodman	---	---	Low	Low	Low.
145B2, 145C2:					
Saybrook	---	---	High	High	Moderate.
148B:					
Proctor	---	---	High	Moderate	Moderate.
150A, 150C:					
Onarga	---	---	Moderate	Low	High.
152A:					
Drummer	---	---	High	High	Moderate.
154A:					
Flanagan	---	---	High	High	Moderate.
171B, 171B2, 171C2:					
Catlin	---	---	High	High	Moderate.

Table 19.--Soil Features--Continued

Map symbol and soil name	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In				
194F:					
Morley	---	---	Moderate	High	Moderate.
198A:					
Elburn	---	---	High	High	Moderate.
199A, 199B:					
Plano	---	---	High	Moderate	Low.
223B2, 223C2:					
Varna	---	---	High	Moderate	Moderate.
224D3, 224E:					
Strawn	---	---	Moderate	Moderate	Moderate.
233B, 233B2, 233C2:					
Birkbeck	---	---	High	High	Moderate.
236A:					
Sabina	---	---	High	High	Moderate.
243B:					
St. Charles	---	---	High	Moderate	Moderate.
244A:					
Hartsburg	---	---	High	High	Low.
257A:					
Clarksdale	---	---	High	High	Moderate.
279B, 279B2, 279C2:					
Rozetta	---	---	High	Moderate	Moderate.
280C2, 280D:					
Fayette	---	---	High	Moderate	Moderate.
356A:					
Elpaso	---	---	High	High	Moderate.
375A, 375B2:					
Rutland	---	---	High	High	Moderate.
379A, 379B:					
Dakota	---	---	Moderate	Low	Moderate.
383B:					
New Vienna	---	---	High	Moderate	Moderate.
388B2:					
Wenona	---	---	Moderate	High	Moderate.
399A, 399B:					
Wea	---	---	Moderate	Low	Moderate.
435A:					
Streator	---	---	High	High	Low.
484A:					
Harco	---	---	High	High	Low.

Table 19.--Soil Features--Continued

Map symbol and soil name	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In				
536:					
Dumps, mine.					
541B2, 541C2:					
Graymont	---	---	High	High	Moderate.
549G:					
Marseilles	20-40	Soft	High	High	Moderate.
567B, 567C2:					
Elkhart	---	---	High	Moderate	Moderate.
570A, 570C:					
Martinsville	---	---	Moderate	Moderate	Moderate.
614A:					
Chenoa	---	---	High	High	Moderate.
618D2, 618E:					
Senachwine	---	---	Moderate	Moderate	Moderate.
802B:					
Orthents	---	---	Moderate	Moderate	Moderate.
865:					
Pits, gravel.					
883F:					
Senachwine	---	---	Moderate	Moderate	Moderate.
Hennepin	---	---	Moderate	Low	Low.
3028A:					
Jules	---	---	High	Low	Low.
3360L:					
Slacwater	---	---	High	Low	Low.
3480L:					
Moundprairie	---	---	High	High	Low.
7081A:					
Littleton	---	---	High	High	Low.
7304B:					
Landes	---	---	Moderate	Low	Low.
8073A:					
Ross	---	---	Moderate	Low	Low.
8074A:					
Radford	---	---	High	High	Low.
8107A:					
Sawmill	---	---	High	High	Low.
8304A:					
Landes	---	---	Moderate	Low	Low.
8368A:					
Raveenwash	---	---	High	Low	Low.

Table 20.--Classification of the Soils

(The classifications given in this table do not include recent amendments to "Soil Taxonomy" for cation-exchange activity class, particle-size class, and dual mineralogy for strongly contrasting classes. Additional information is available at local offices of the Natural Resources Conservation Service. An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Birkbeck	Fine-silty, mixed, mesic Oxyaquic Hapludalfs
*Catlin	Fine-silty, mixed, mesic Oxyaquic Argiudolls
Chenoa	Fine, illitic, mesic Aquic Argiudolls
Clarksdale	Fine, smectitic, mesic Udollic Epiaqualfs
Dakota	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Dodge	Fine-silty, mixed, mesic Typic Hapludalfs
Drummer	Fine-silty, mixed, mesic Typic Endoaquolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
*Elkhart	Fine-silty, mixed, mesic Typic Argiudolls
Elpaso	Fine-silty, mixed, mesic Typic Endoaquolls
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Flanagan	Fine, smectitic, mesic Aquertic Argiudolls
*Graymont	Fine-silty, mixed, mesic Oxyaquic Argiudolls
Harco	Fine-silty, mixed, mesic Aquic Argiudolls
Hartsburg	Fine-silty, mixed, mesic Typic Endoaquolls
Hennepin	Fine-loamy, mixed, mesic Typic Eutrochrepts
Ipava	Fine, smectitic, mesic Aquertic Argiudolls
Jules	Coarse-silty, mixed, calcareous, mesic Typic Udifluvents
Keomah	Fine, smectitic, mesic Aeric Ochraqualfs
Landes	Coarse-loamy, mixed, mesic Fluventic Hapludolls
*La Rose	Fine-loamy, mixed, mesic Typic Argiudolls
Littleton	Fine-silty, mixed, mesic Aquic Cumulic Hapludolls
Marseilles	Fine-silty, mixed, mesic Typic Hapludalfs
Martinsville	Fine-loamy, mixed, mesic Typic Hapludalfs
Morley	Fine, illitic, mesic Oxyaquic Hapludalfs
Moundprairie	Fine-silty, mixed, calcareous, mesic Mollic Fluvaquents
Muscatune	Fine-silty, mixed, mesic Aquic Argiudolls
New Vienna	Fine-silty, mixed, mesic Oxyaquic Hapludalfs
Onarga	Coarse-loamy, mixed, mesic Typic Argiudolls
Orthents	Mesic Typic Udorthents
*Osco	Fine-silty, mixed, mesic Typic Argiudolls
Plano	Fine-silty, mixed, mesic Typic Argiudolls
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Radford	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Raveenwash	Coarse-loamy, mixed, calcareous, mesic Aquic Udifluvents
Rodman	Sandy-skeletal, mixed, mesic Typic Hapludolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
*Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Rutland	Fine, smectitic, mesic Aquertic Argiudolls
Sabina	Fine, smectitic, mesic Vertic Epiaqualfs
Sable	Fine-silty, mixed, mesic Typic Endoaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Endoaquolls
*Saybrook	Fine-silty, mixed, mesic Oxyaquic Argiudolls
Senachwine	Fine-loamy, mixed, mesic Typic Hapludalfs
Slacwater	Fine-silty, mixed, calcareous, mesic Mollic Fluvaquents
*Sparta	Sandy, mixed, mesic Entic Hapludolls
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Strawn	Fine-loamy, mixed, mesic Typic Hapludalfs
Streator	Fine, smectitic, mesic Vertic Endoaquolls
*Swygert	Fine, mixed, mesic Aquertic Argiudolls
*Sylvan	Fine-silty, mixed, mesic Typic Hapludalfs
*Varna	Fine, illitic, mesic Oxyaquic Argiudolls
Wea	Fine-loamy, mixed, mesic Typic Argiudolls
*Wenona	Fine, smectitic, mesic Vertic Argiudolls
Worthen	Fine-silty, mixed, mesic Cumulic Hapludolls

NRCS SOILS 37A
3/95

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL

CULTURAL FEATURES

BOUNDARIES

- • National, state, or province
- • County or parish
- Minor civil division
- Reservation, (national forest or park, state forest or park)
- Land grant
- Limit of soil survey (label) and/or denied access areas
- • Field sheet matchline & neatline
- Previously published survey

OTHER BOUNDARY (label)

- Airport, airfield — Davis airstrip
- • Cemetery — St Johns Cemetery
- City / county Park — Central Park

STATE COORDINATE TICK

• LAND DIVISION CORNERS (section and land grants)

• GEOGRAPHIC COORDINATE TICK

TRANSPORTATION

- Divided roads
- Other roads
- # Trails

ROAD EMBLEMS & DESIGNATIONS

- • Interstate — 79, 79 345
- • Federal — 410, 410 224
- • State — 52, 52 347
- County, farm, or ranch — 376

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPELINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad
- ++ Single side slope (showing actual feature location)

DAMS

- Medium or small — W

LANDFORM FEATURES

- Prominent Hill or Peak
- Soil Sample Site

* Cultural features for use in Illinois

CULTURAL FEATURES (cont.)

MISCELLANEOUS CULTURAL FEATURES

- Farmland, house (omit in urban areas)
- Church
- School
- Other Religion (label) — Mt Carmel
- Located object (label) — Ranger Station
- Tank (label) — Petroleum
- Lookout Tower
- Oil and / or Natural Gas Wells
- Windmill
- Lighthouse

HYDROGRAPHIC FEATURES

STREAMS

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

DRAINAGE AND IRRIGATION

- Double line canal (label) — CANAL
- Perennial drainage and/or irrigation ditch
- Intermittent drainage and/or irrigation ditch

SMALL LAKES, PONDS, AND RESERVOIRS

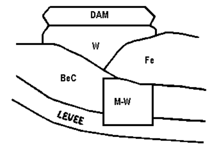
- Perennial water
- Miscellaneous water
- Flood pool line — FLOOD POOL LINE

MISCELLANEOUS WATER FEATURES

- Spring
- Well, artesian
- Well, irrigation

SPECIAL SYMBOLS FOR SOIL SURVEY AND SSURGO

SOIL DELINEATIONS AND SYMBOLS



LANDFORM FEATURES

ESCARPMENTS

- Bedrock
- Other than bedrock

SHORT STEEP SLOPE

GULLY

DEPRESSION, closed

SINKHOLE

EXCAVATIONS

PITS

- Borrow pit
- Gravel pit
- Mine or quarry

LANDFILL

MISCELLANEOUS SURFACE FEATURES

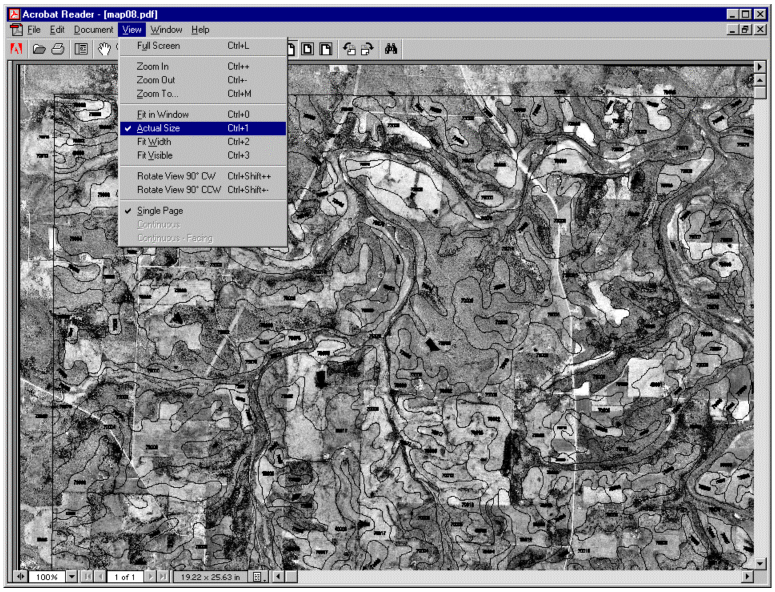
- Blowout
- Clay spot
- Gravelly spot
- Lava flow
- Marsh or swamp
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip
- Sodic spot
- Spoil area
- Stony spot
- Very stony spot
- Wet spot

RECOMMENDED AD HOC SOIL SYMBOLS

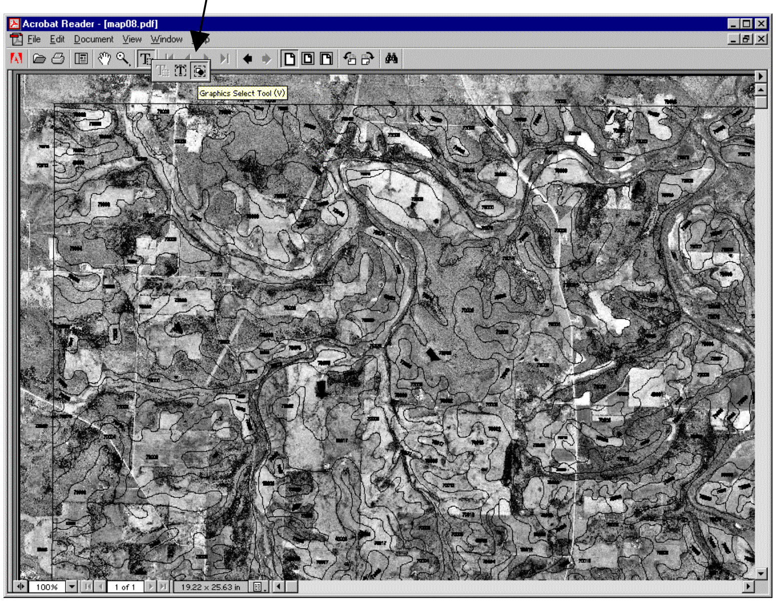
	SYMBOL_ID		SYMBOL_ID	
	1		23	
	2		24	
	3		25	
	4	Gray spot	26 GSP	
	5		27	
	6		28	
	7	Calcareous spot	29 CSP	
	8	Muck spot	30 MUC	
	9		31	
	10		32	
	11		33	
Dumps	12 DMP		34	
	13	Mine subsided Area	35 MSA	
	14		36	
Oil brine spot	15 OBS		37	
	16		38	
	17		39	
	18	Glacial Till spot	40 GLA	
	19		41	
Disturbed soil spot	20 DSS		42	
	21		43	
	22		44	

Printing Soil Survey Maps

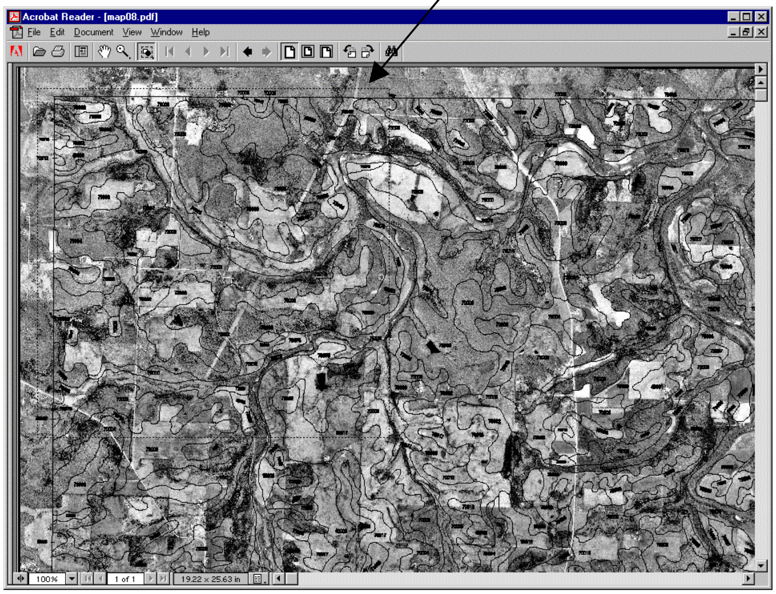
The soil survey maps were made at a scale of 1:12000 and were designed to be used at that scale. To print the maps at 1:12000 scale, set the view to Actual Size from the View pull down menu.



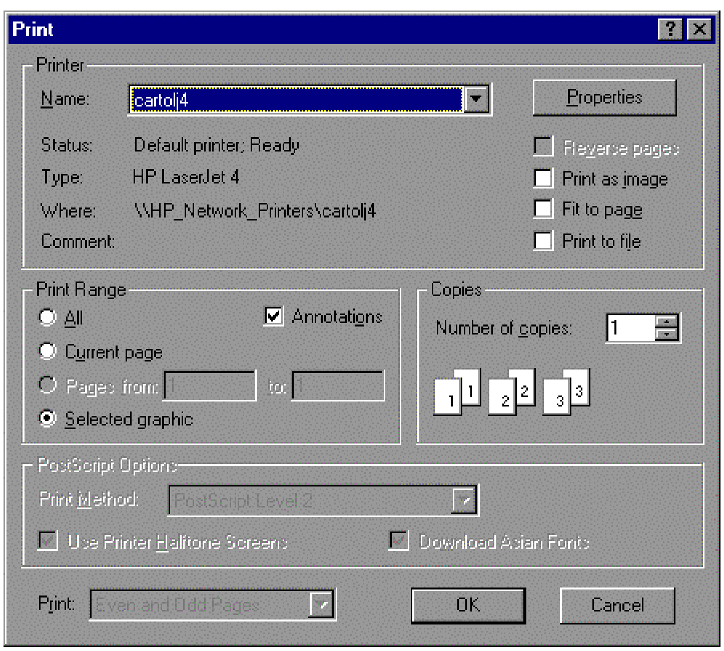
Using the pan tool, go to the area you would like to print. Select the Graphic Selection Tool by holding down the Text Selection Tool button and clicking on the Graphic Selection Tool button.

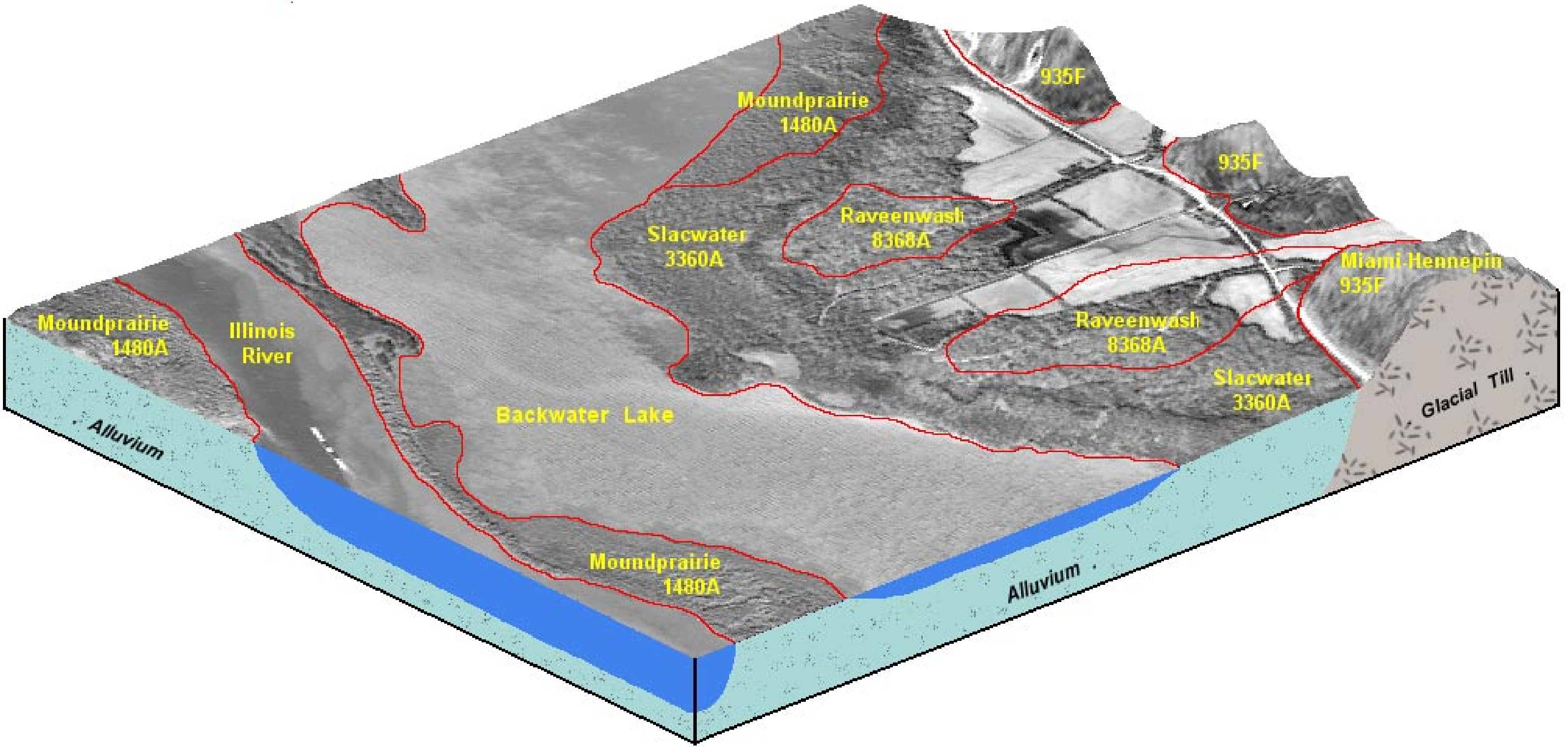


Then using the Graphic Selection Tool drag a box around the area you would like to print. Note dashed lines forming a box around area to print.

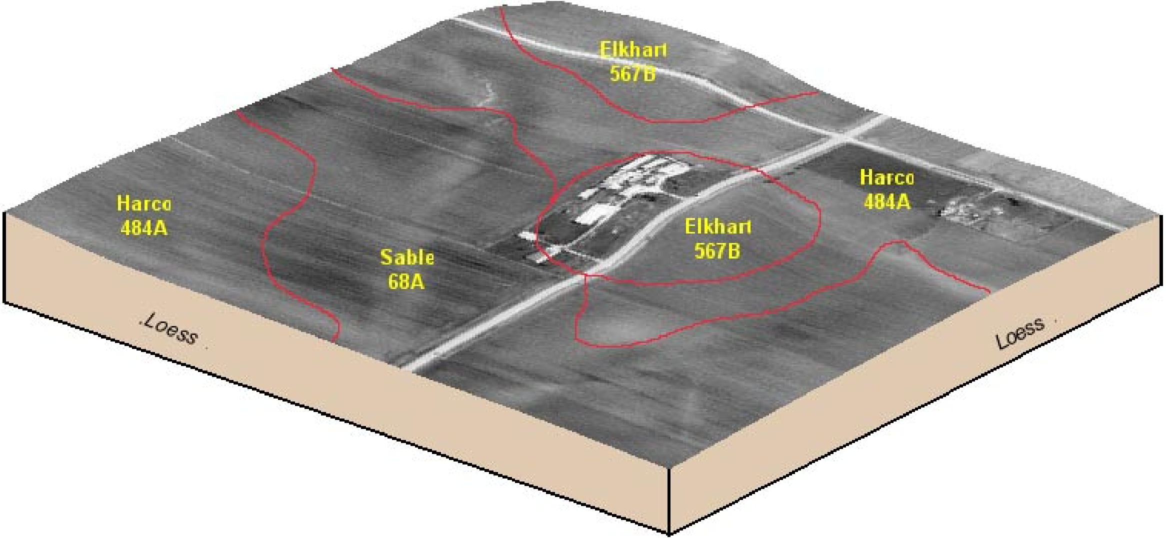


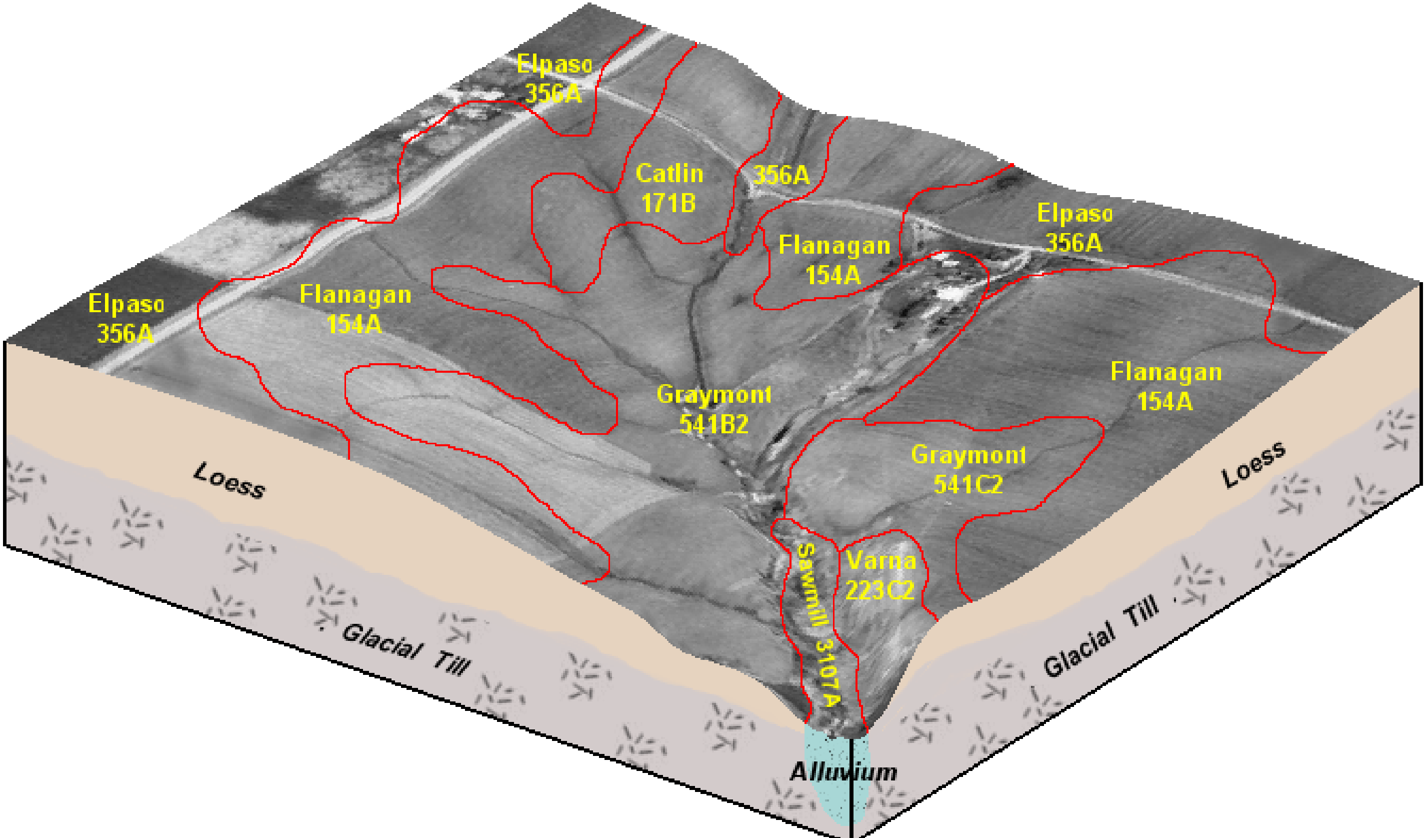
Select File Print. The Print Range will be set to Selected graphic. Click OK and the map will be sent to the printer.



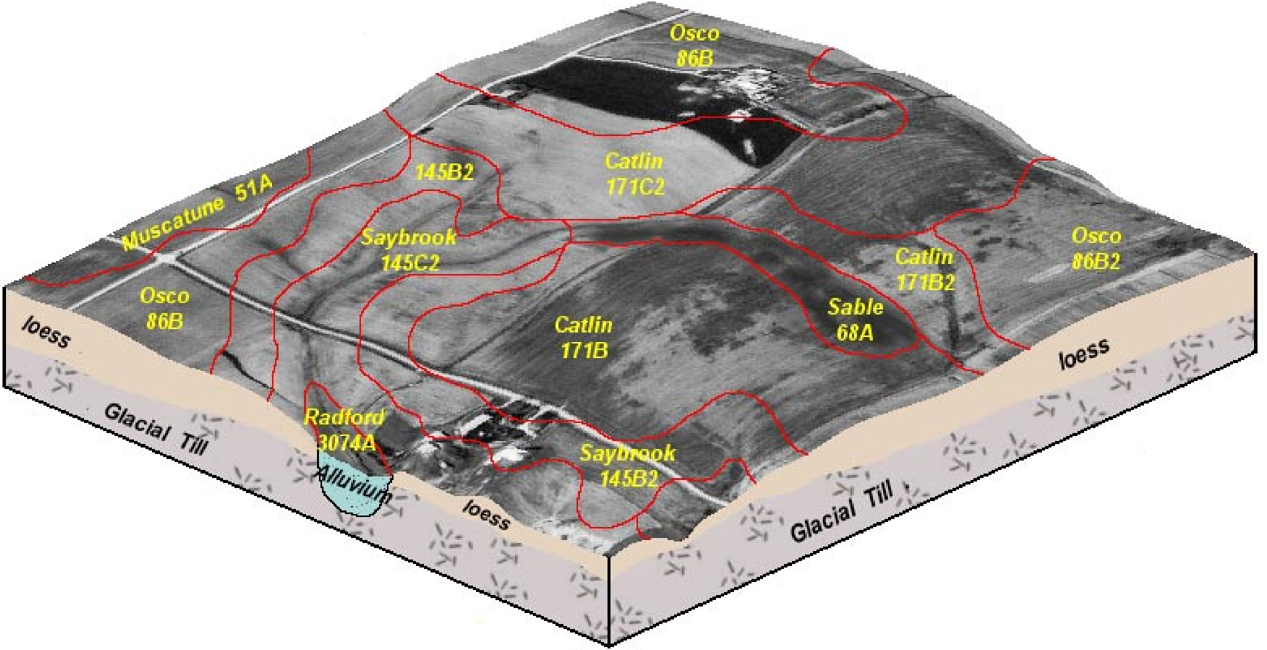


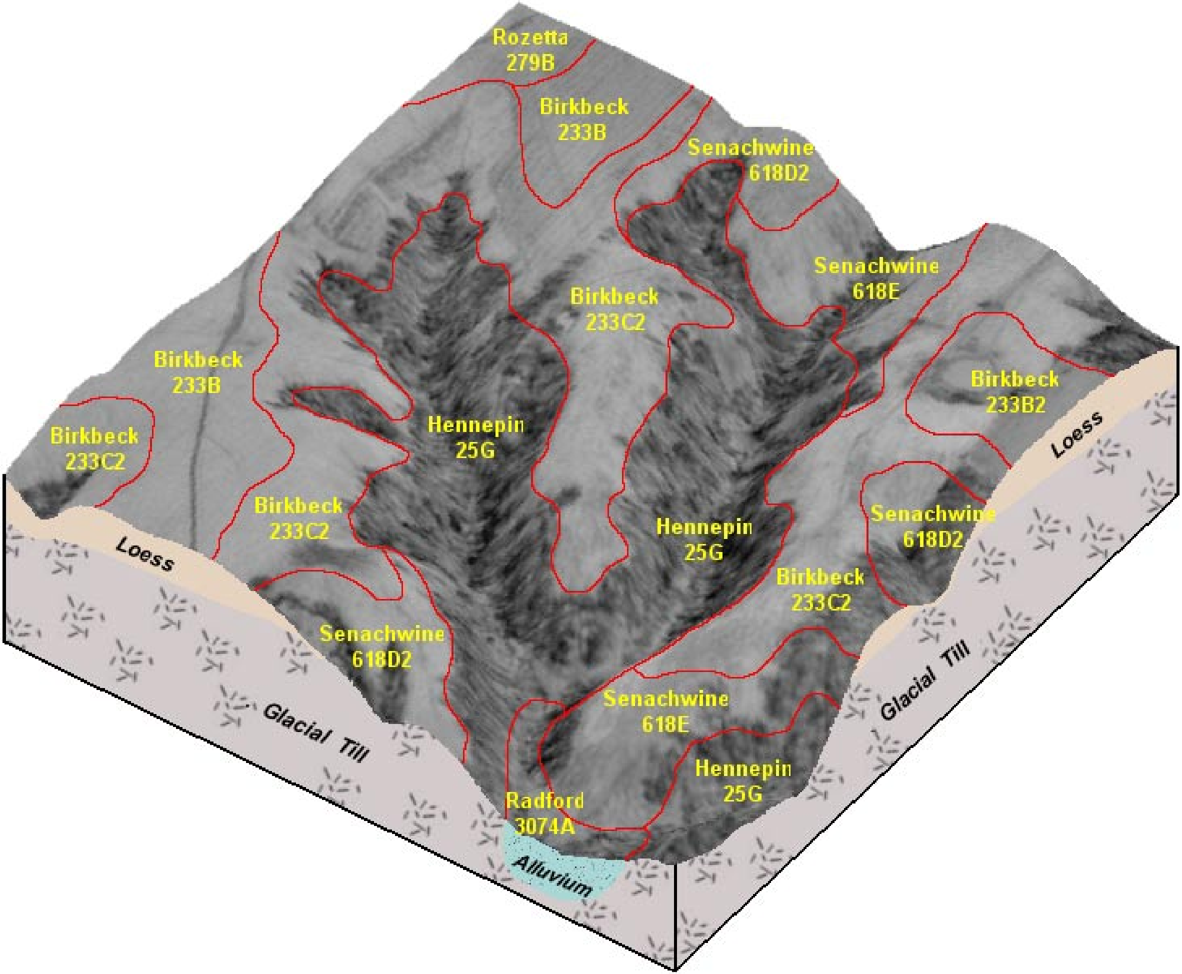
Moundprairie 1480A
935F
935F
Raveenwash 8368A
Slacwater 3360A
Miami-Hennepin 935F
Moundprairie 1480A
Illinois River
Raveenwash 8368A
Slacwater 3360A
Glacial Till
Backwater Lake
Alluvium
Moundprairie 1480A
Alluvium

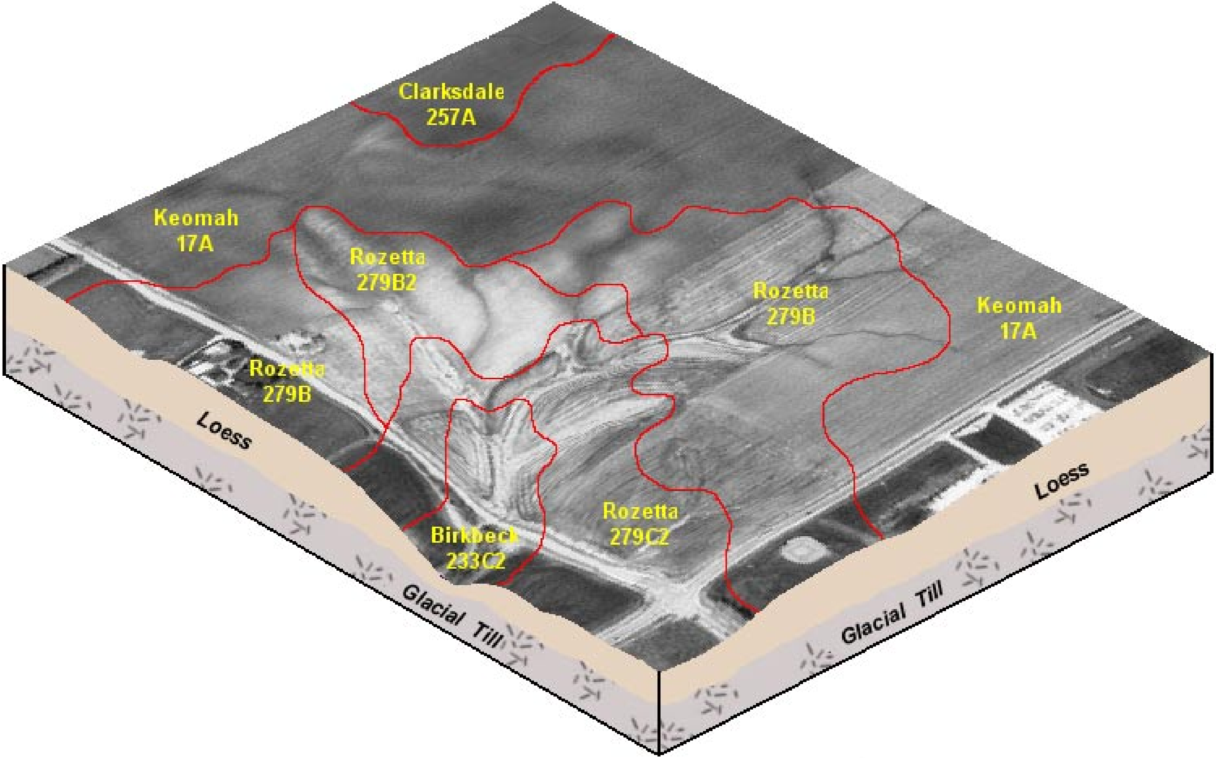

Elkhart
567B
Harco
484A
Harco
484A
Elkhart
567B
Sable
68A
Loess
Loess

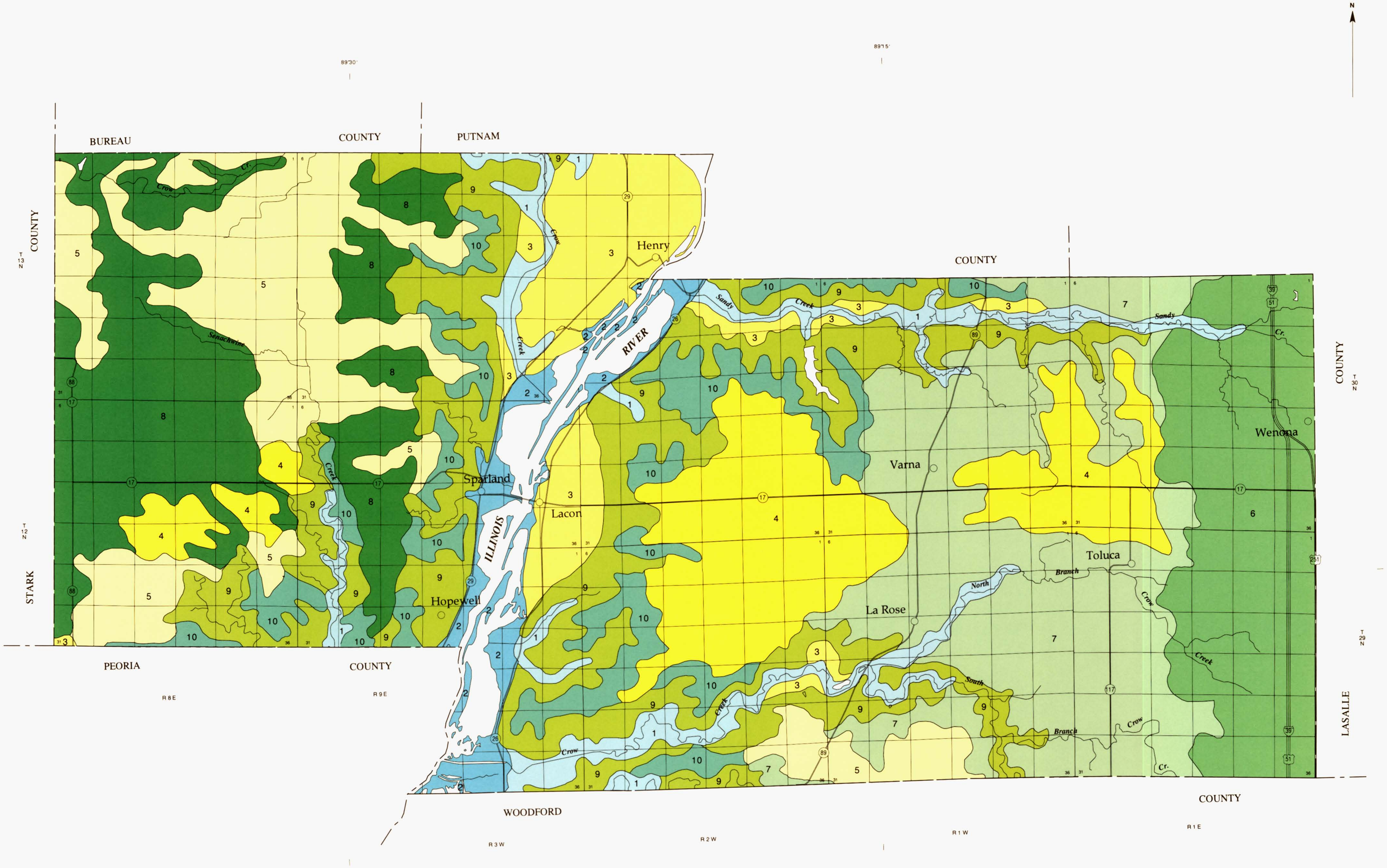


Elpaso
356A
Catlin
171B
356A
Elpaso
356A
Flanagan
154A
Elpaso
356A
Flanagan
154A
Graymont
541B2
Flanagan
154A
Graymont
541C2
Sawmill 3107A
Varna
223C2
Loess
Loess
Glacial Till
Glacial Till
Alluvium


Osco
86B
Catlin
171C2
145B2
Muscatune 51A
Saybrook
145C2
Osco
86B2
Catlin
171B2
Osco
86B
Sable
68A
Catlin
171B
loess
loess
Glacial Till
Radford
3074A
Alluvium
Saybrook
145B2
loess
Glacial Till


Rozetta
279B
Birkbeck
233B
Senachwine
618D2
Senachwine
618E
Birkbeck
233C2
Birkbeck
233B
Birkbeck
233C2
Hennepin
25G
Birkbeck
233B2
Loess
Birkbeck
233C2
Hennepin
25G
Senachwine
618D2
Loess
Birkbeck
233C2
Senachwine
618D2
Glacial Till
Senachwine
618E
Glacial Till
Hennepin
25G
Radford
3074A
Alluvium


Clarksdale
257A
Keomah
17A
Rozetta
279B2
Rozetta
279B
Keomah
17A
Rozetta
279B
Loess
Birkbeck
233C2
Rozetta
279C2
Loess
Glacial Till
Glacial Till



SOIL LEGEND*

1	Radford-Ross-Landes association
2	Moundprairie-Slacwater association
3	Dakota-Wea association
4	Harco-Sable-Elkhart association
5	Muscatune-Osco-Sable association
6	Rutland-Streator-Wenona association
7	Flanagan-Graymont-Elpaso association
8	Catlin-Saybrook-Osco associaton
9	Hennepin-Birkbeck-Senachwine association
10	Rozetta-Keomah association

*The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1997

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
IN COOPERATION WITH
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
MARSHALL COUNTY, ILLINOIS

Scale 1:100000

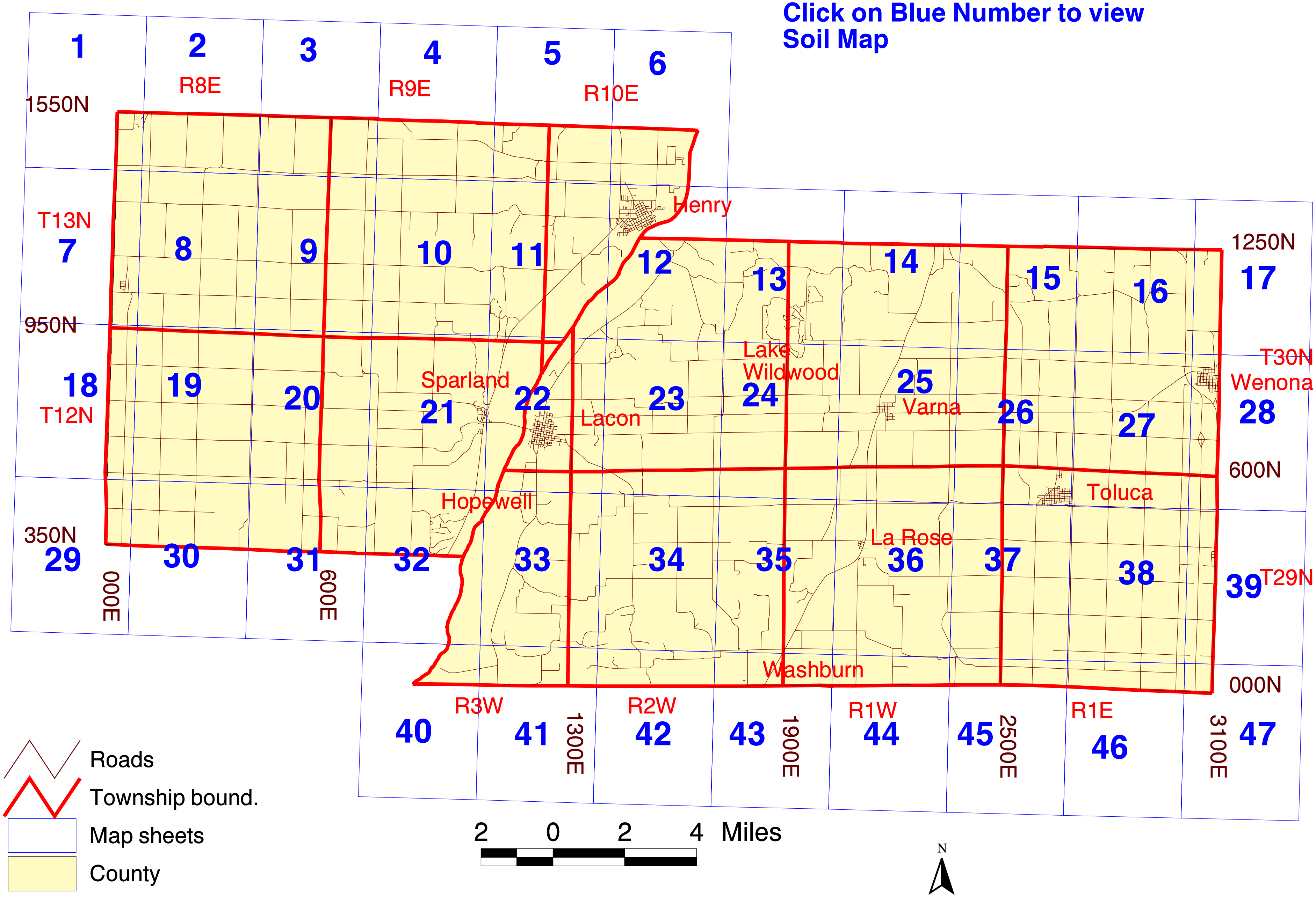
4 0 4
MILES

8 0 8
KILOMETERS

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

Marshall County
Index to Map Sheets

Click on Blue Number to view Soil Map



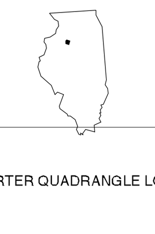
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
BRADFORD SE QUADRANGLE
SHEET NUMBER 1 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 BRADFORD NW
2 BRADFORD NE
3 WHITEFIELD NW
4 BRADFORD SW
5 WHITEFIELD SW (SHEET 2)
6 CASTLETON NW
7 CASTLETON NE (SHEET 7)
8 LA PRAIRIE CENTER NW (SHEET 8)

INDEX TO ADJOINING 3.75 MAPS

BRADFORD SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 1 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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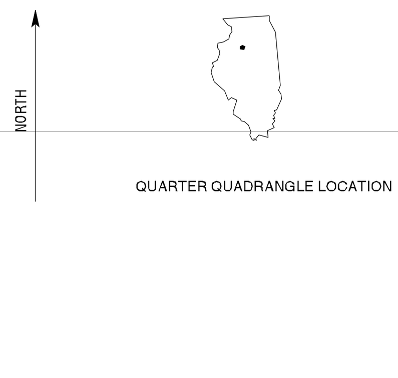
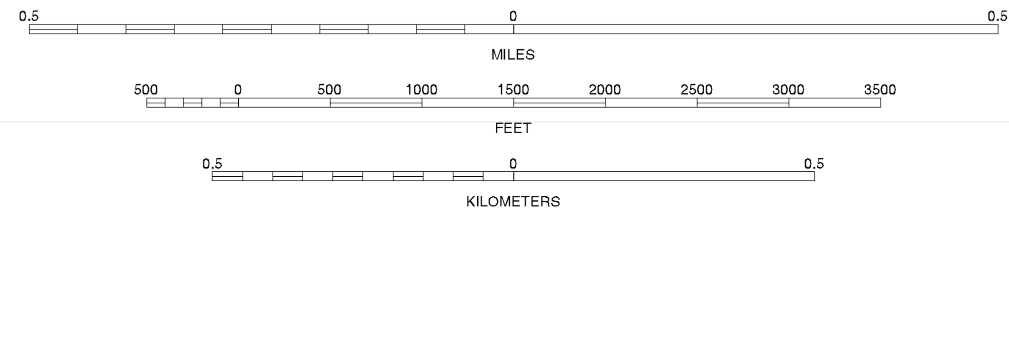
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



1	2	3
4		5
6	7	8

1 BRADFORD NE
2 WHITEFIELD NW
3 WHITEFIELD NE
4 BRADFORD SE (SHEET 1)
5 WHITEFIELD SE (SHEET 3)
6 CASTLETON NE (SHEET 7)
7 LA PRAIRIE CENTER NW (SHEET 8)
8 LA PRAIRIE CENTER NE (SHEET 9)

INDEX TO ADJOINING 3.75 MAPS

WHITEFIELD SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 2 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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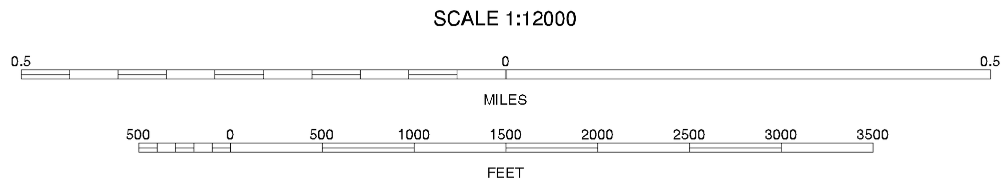
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



1	2	3
4		5
6	7	8

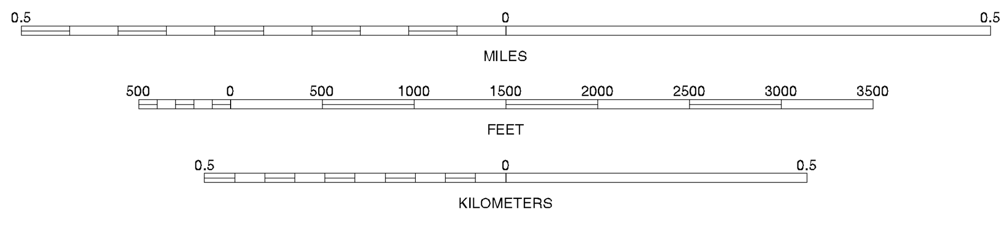
1 WHITEFIELD NW
2 WHITEFIELD NE
3 PUTNAM NW
4 WHITEFIELD SW (SHEET 2)
5 PUTNAM SW (SHEET 4)
6 LA PRAIRIE CENTER NW (SHEET 8)
7 LA PRAIRIE CENTER NE (SHEET 9)
8 LACON NW (SHEET 10)

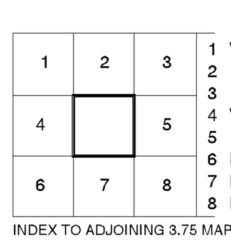
INDEX TO ADJOINING 3.75 MAPS

WHITEFIELD SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 3 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.





1 WHITEFIELD NE
2 PUTNAM NW
3 PUTNAM NE
4 WHITEFIELD SE (SHEET 3)
5 PUTNAM SE (SHEET 5)
6 LA PRAIRIE CENTER NE (SHEET 9)
7 LACON NW (SHEET 10)
8 LACON NE (SHEET 11)

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PUTNAM SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 4 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
PUTNAM SE QUADRANGLE
SHEET NUMBER 5 OF 47

89°26'15" 41°11'15" 89°22'30" 41°11'15"

41°07'30" 89°26'15" 41°07'30" 89°22'30"

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

1	2	3
4		5
6	7	8

1 PUTNAM NW
2 PUTNAM NE
3 FLORID NW
4 PUTNAM SW (SHEET 4)
5 FLORID SW (SHEET 6)
6 LACON NW (SHEET 10)
7 LACON NE (SHEET 11)
8 HENRY NW (SHEET 12)

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PUTNAM SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 5 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

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1 PUTNAM NE
2 FLORID NW
3 FLORID NE
4 PUTNAM SE (SHEET 5)
5 FLORID SE
6 LACON NE (SHEET 11)
7 HENRY NW (SHEET 12)
8 HENRY NE (SHEET 13)

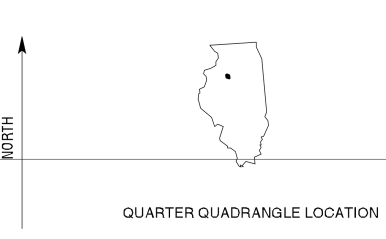
FLORID SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 6 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
CASTLETON NE QUADRANGLE
SHEET NUMBER 7 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



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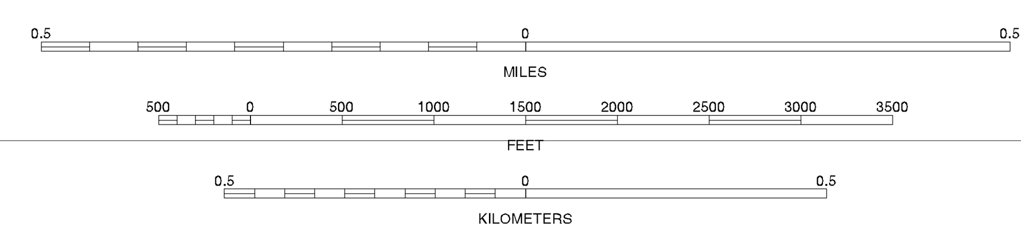

1	2	3
4		5
6	7	8

1 BRADFORD SW
2 BRADFORD SE (SHEET 1)
3 WHITEFIELD SW (SHEET 2)
4 CASTLETON NW
5 LA PRAIRIE CENTER NW (SHEET 8)
6 CASTLETON SW
7 CASTLETON SE (SHEET 18)
8 LA PRAIRIE CENTER SW (SHEET 19)

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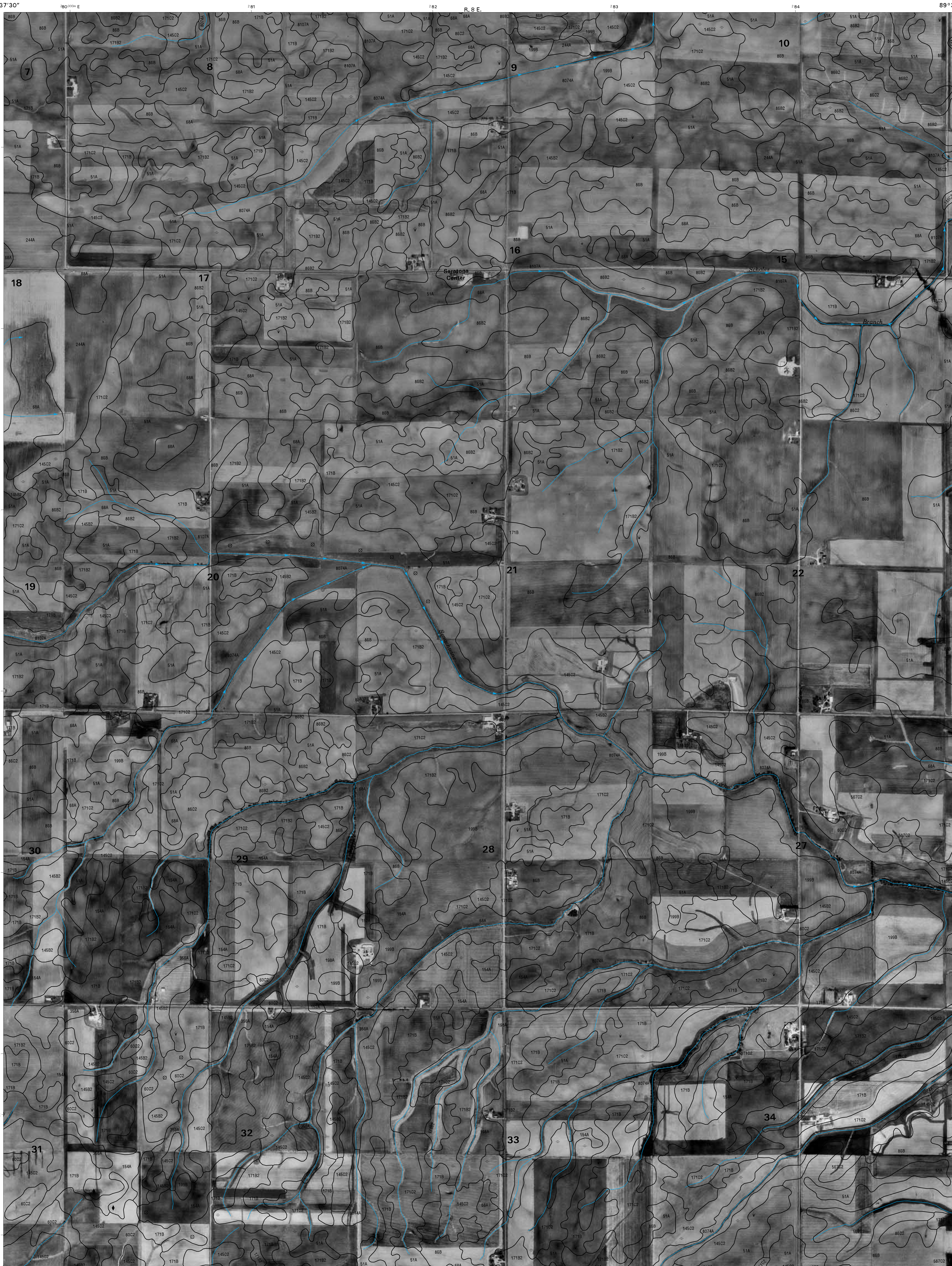
CASTLETON NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 7 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
LA PRAIRIE CENTER NW QUADRANGLE
SHEET NUMBER 8 OF 47

89°37'30" 41°07'30" 89°33'45" 41°07'30"



41°03'45" 89°37'30" 41°03'45" 89°33'45"

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 BRADFORD SE (SHEET 1)
2 WHITEFIELD SW (SHEET 2)
3 WHITEFIELD SE (SHEET 3)
4 CASTLETON NE (SHEET 7)
5 LA PRAIRIE CENTER NE (SHEET 9)
6 CASTLETON SE (SHEET 18)
7 LA PRAIRIE CENTER SW (SHEET 19)
8 LA PRAIRIE CENTER SE (SHEET 20)

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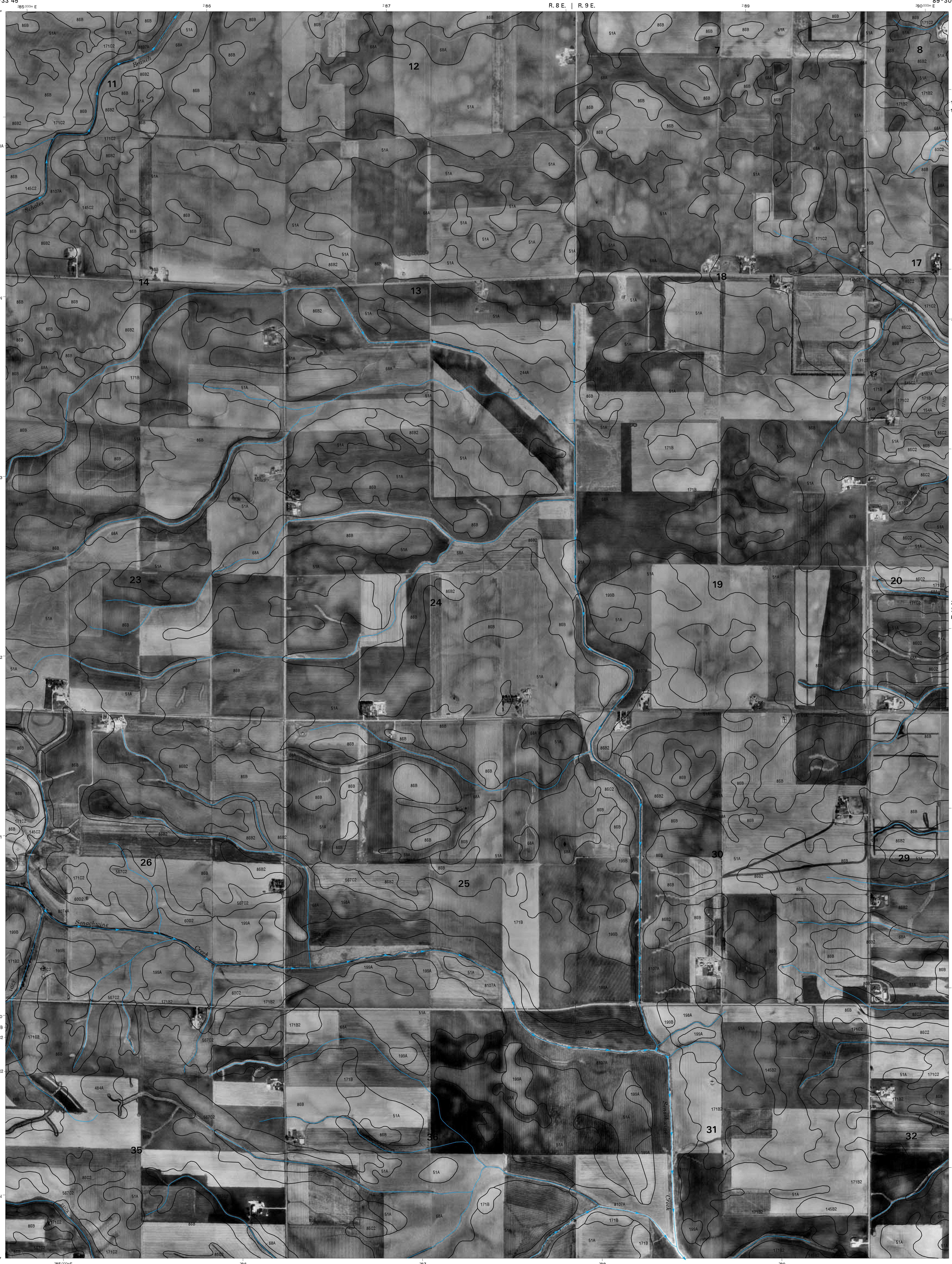
LA PRAIRIE CENTER NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 8 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
LA PRAIRIE CENTER NE QUADRANGLE
SHEET NUMBER 9 OF 47



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1 WHITEFIELD SW (SHEET 2)
2 WHITEFIELD SE (SHEET 3)
3 PUTNAM SW (SHEET 4)
4 LA PRAIRIE CENTER NW (SHEET 8)
5 LACON NW (SHEET 10)
6 LA PRAIRIE CENTER SW (SHEET 19)
7 LA PRAIRIE CENTER SE (SHEET 20)
8 LACON SW (SHEET 21)

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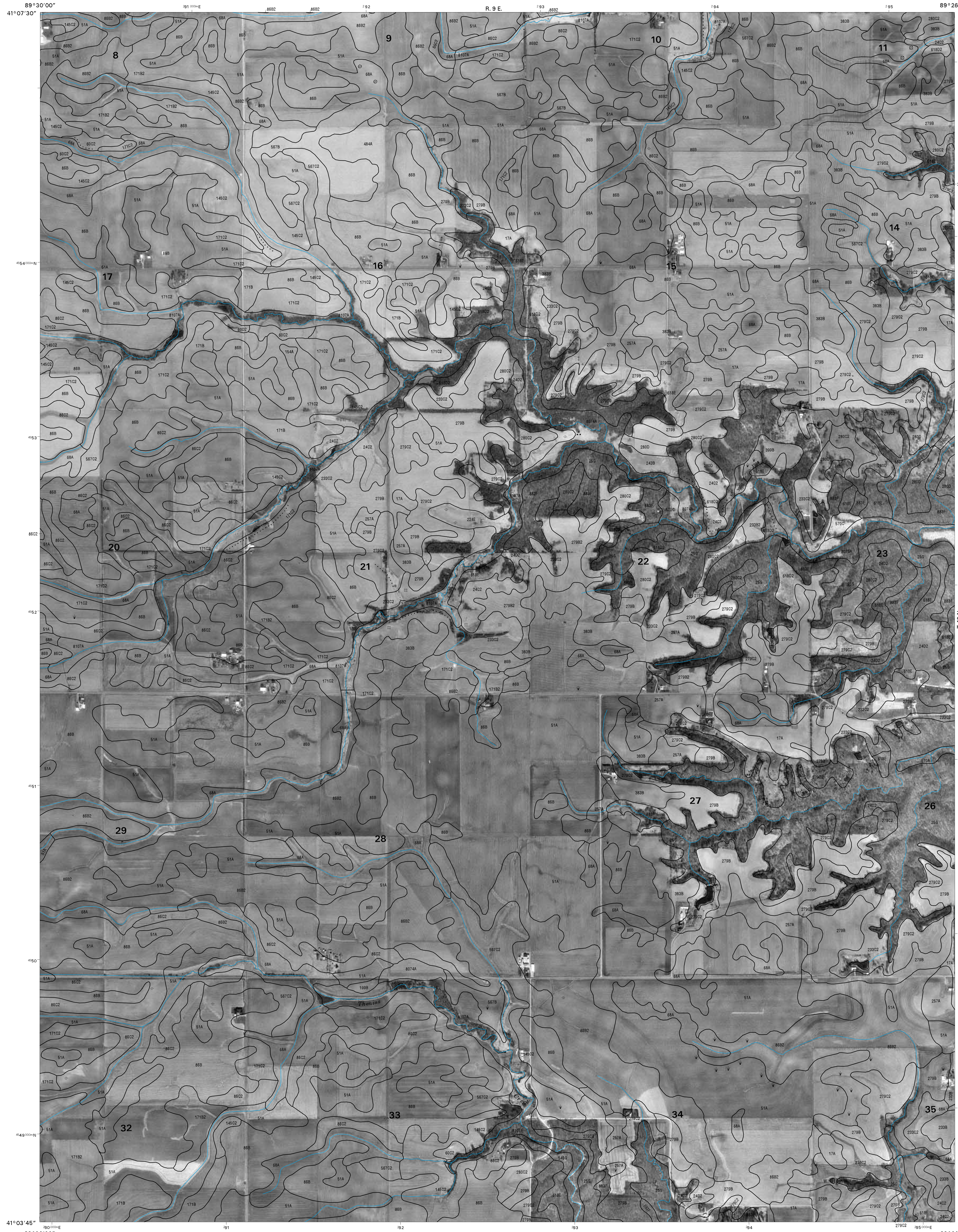
LA PRAIRIE CENTER NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 9 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
LACON NW QUADRANGLE
SHEET NUMBER 10 OF 47



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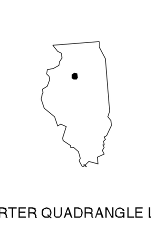
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 WHITEFIELD SE (SHEET 3)
2 PUTNAM SW (SHEET 4)
3 PUTNAM SE (SHEET 5)
4 LA PRAIRIE CENTER NE (SHEET 9)
5 LACON NE (SHEET 11)
6 LA PRAIRIE CENTER SE (SHEET 20)
7 LACON SW (SHEET 21)
8 LACON SE (SHEET 22)

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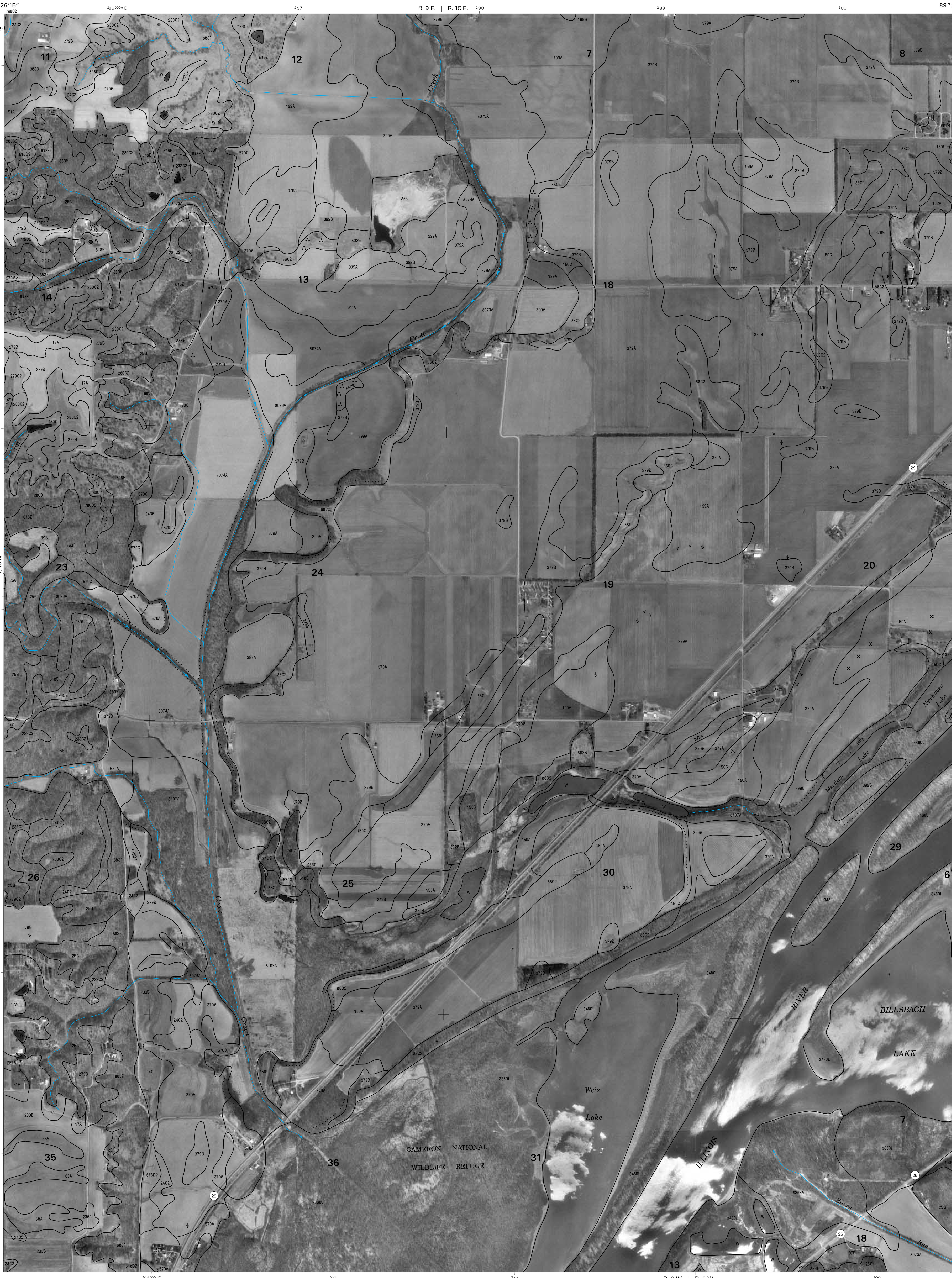
LACON NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 10 OF 47



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 PUTNAM SW (SHEET 4)
2 PUTNAM SE (SHEET 5)
3 FLORID SW (SHEET 6)
4 LACON NW (SHEET 10)
5 HENRY NW (SHEET 12)
6 LACON SW (SHEET 21)
7 LACON SE (SHEET 22)
8 HENRY SW (SHEET 23)

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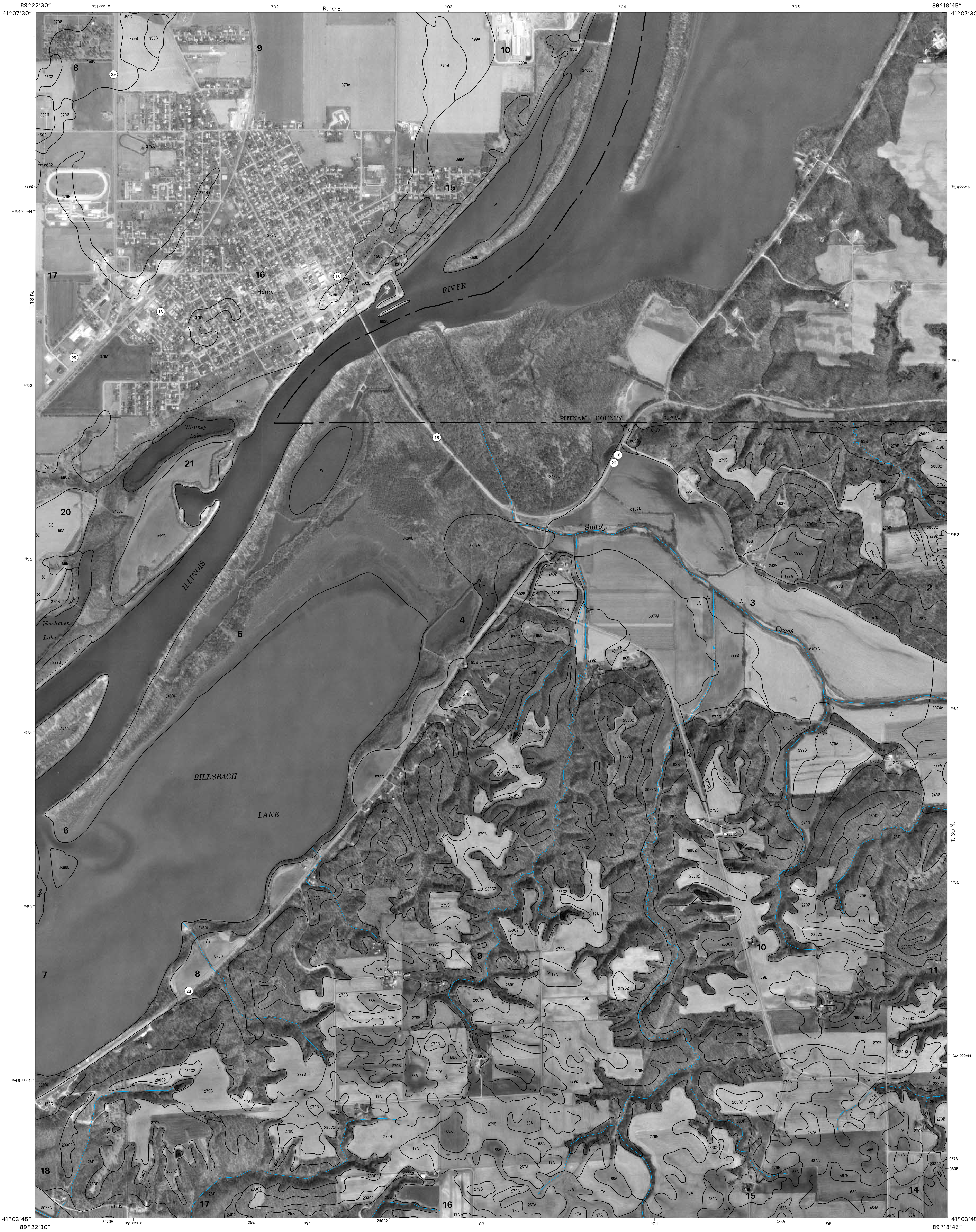
LACON NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 11 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
HENRY NW QUADRANGLE
SHEET NUMBER 12 OF 47



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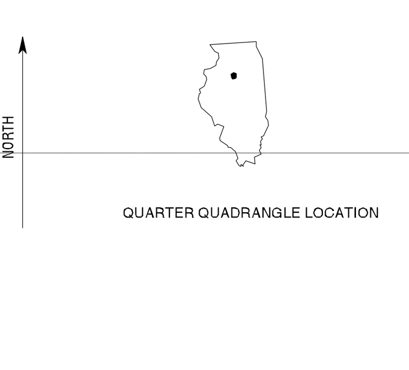
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



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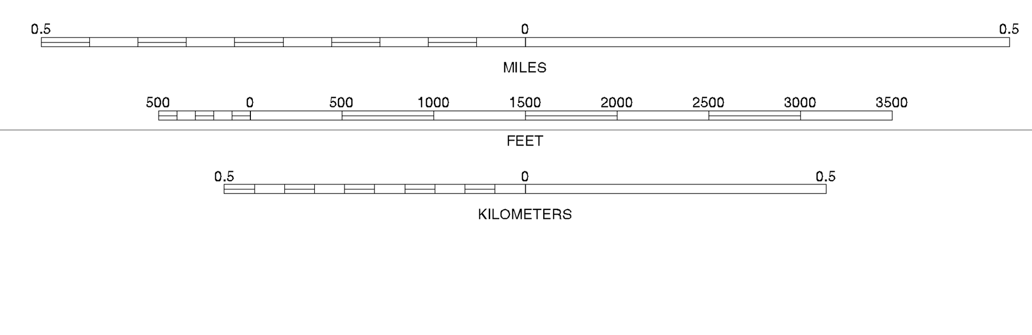

1	2	3
4		5
6	7	8

1 PUTNAM SE (SHEET 5)
2 FLORID SW (SHEET 6)
3 FLORID SE
4 LACON NE (SHEET 11)
5 HENRY NE (SHEET 13)
6 LACON SE (SHEET 22)
7 HENRY SW (SHEET 23)
8 HENRY SE (SHEET 24)

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HENRY NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 12 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

SCALE 1:12000

MILES: 0.5 — 0 — 0.5

FEET: 500 — 0 — 500 — 1000 — 1500 — 2000 — 2500 — 3000 — 3500

KILOMETERS: 0.5 — 0 — 0.5

1	2	3
4		5
6	7	8

1 FLORID SW (SHEET 6)
2 FLORID SE
3 MCNABB SW
4 HENRY NW (SHEET 12)
5 VARNA NW (SHEET 14)
6 HENRY SW (SHEET 23)
7 HENRY SE (SHEET 24)
8 VARNA SW (SHEET 25)

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HENRY NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 13 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
VARNA NW QUADRANGLE
SHEET NUMBER 14 OF 47

89°15'00" 41°07'30" — 89°11'15" 41°07'30"

41°03'45" 89°15'00" — 41°03'45" 89°11'15"

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 FLORID SE
2 MCNABB SW
3 MCNABB SE
4 HENRY NE (SHEET 13)
5 VARNA NE (SHEET 15)
6 HENRY SE (SHEET 24)
7 VARNA SW (SHEET 25)
8 VARNA SE (SHEET 26)

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VARNA NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 14 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

89°11′15″ 41°07′30″ 89°07′30″ 41°07′30″

41°03′45″ 89°11′15″ 41°03′45″ 89°07′30″

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 MCNABB SW
2 MCNABB SE
3 TONICA SW
4 VARNA NW (SHEET 14)
5 WENONA NW (SHEET 16)
6 VARNA SW (SHEET 25)
7 VARNA SE (SHEET 26)
8 WENONA SW (SHEET 27)

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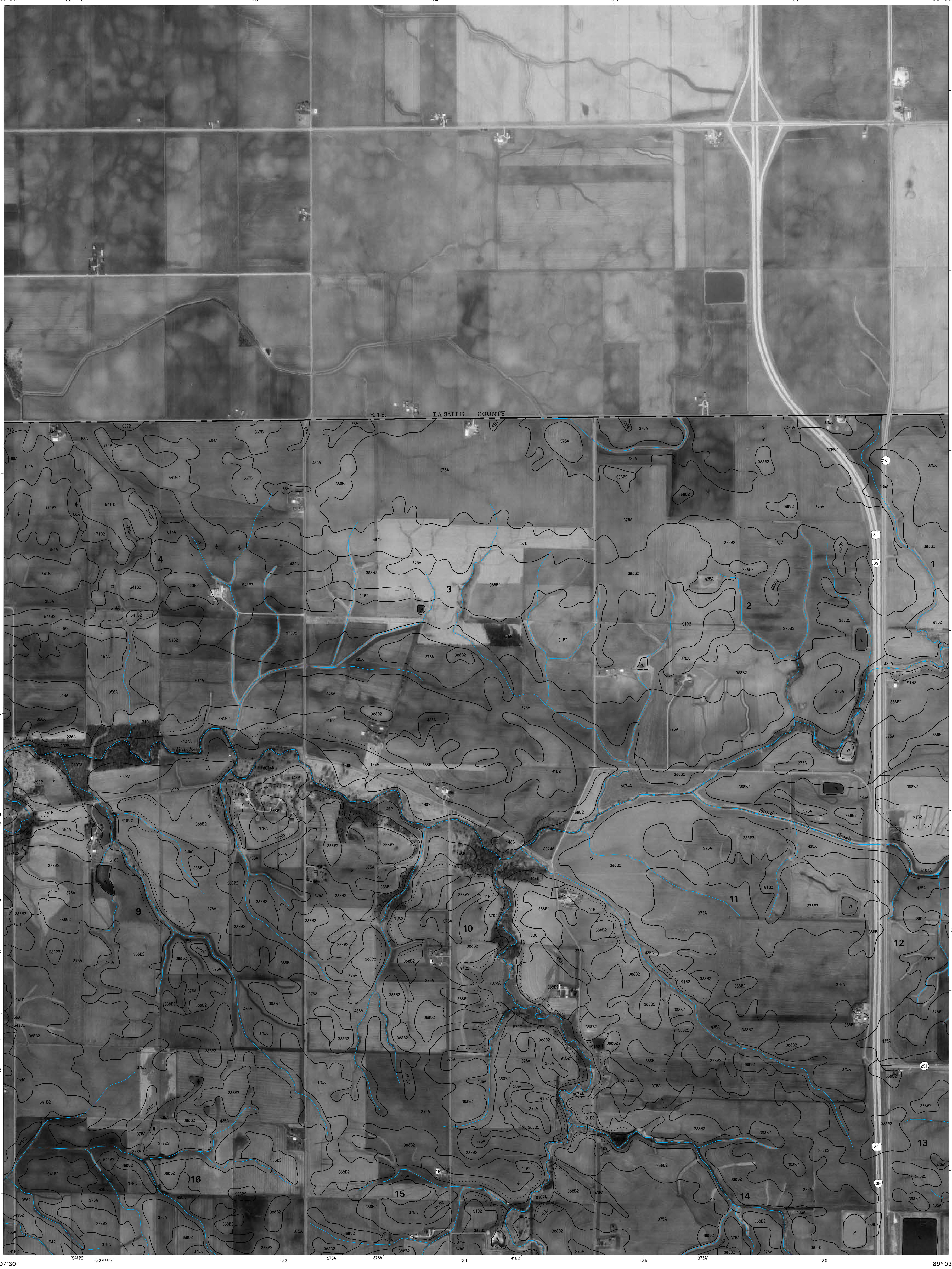
VARNA NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 15 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
WENONA NW QUADRANGLE
SHEET NUMBER 16 OF 47



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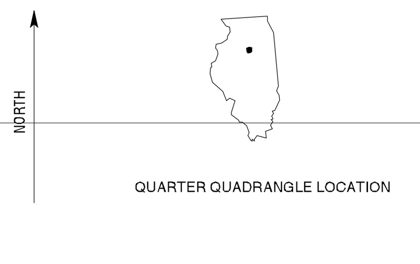
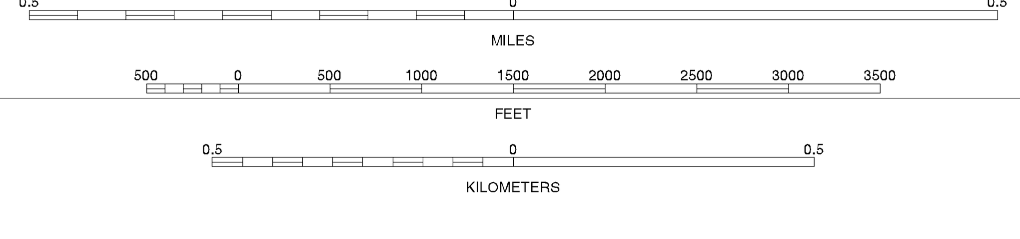
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.





1	2	3
4		5
6	7	8

1 MCNABB SE
2 TONICA SW
3 TONICA SE
4 VARNA NE (SHEET 15)
5 WENONA NE (SHEET 17)
6 VARNA SE (SHEET 26)
7 WENONA SW (SHEET 27)
8 WENONA SE (SHEET 28)

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WENONA NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 16 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 TONICA SW
2 TONICA SE
3 LEONORE SW
4 WENONA NW (SHEET 16)
5 LONG POINT NW
6 WENONA SW (SHEET 27)
7 WENONA SE (SHEET 28)
8 LONG POINT SW

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WENONA NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 17 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
CASTLETON SE QUADRANGLE
SHEET NUMBER 18 OF 47

89°41′15″ 89°37′30″
41°03′45″ 41°03′45″

41°00′00″ 41°00′00″
89°41′15″ 89°37′30″

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 CASTLETON NW
2 CASTLETON NE (SHEET 7)
3 LA PRAIRIE CENTER NW (SHEET 8)
4 CASTLETON SW
5 LA PRAIRIE CENTER SW (SHEET 19)
6 EDELSTEIN NW
7 EDELSTEIN NE (SHEET 29)
8 ROME NW (SHEET 30)

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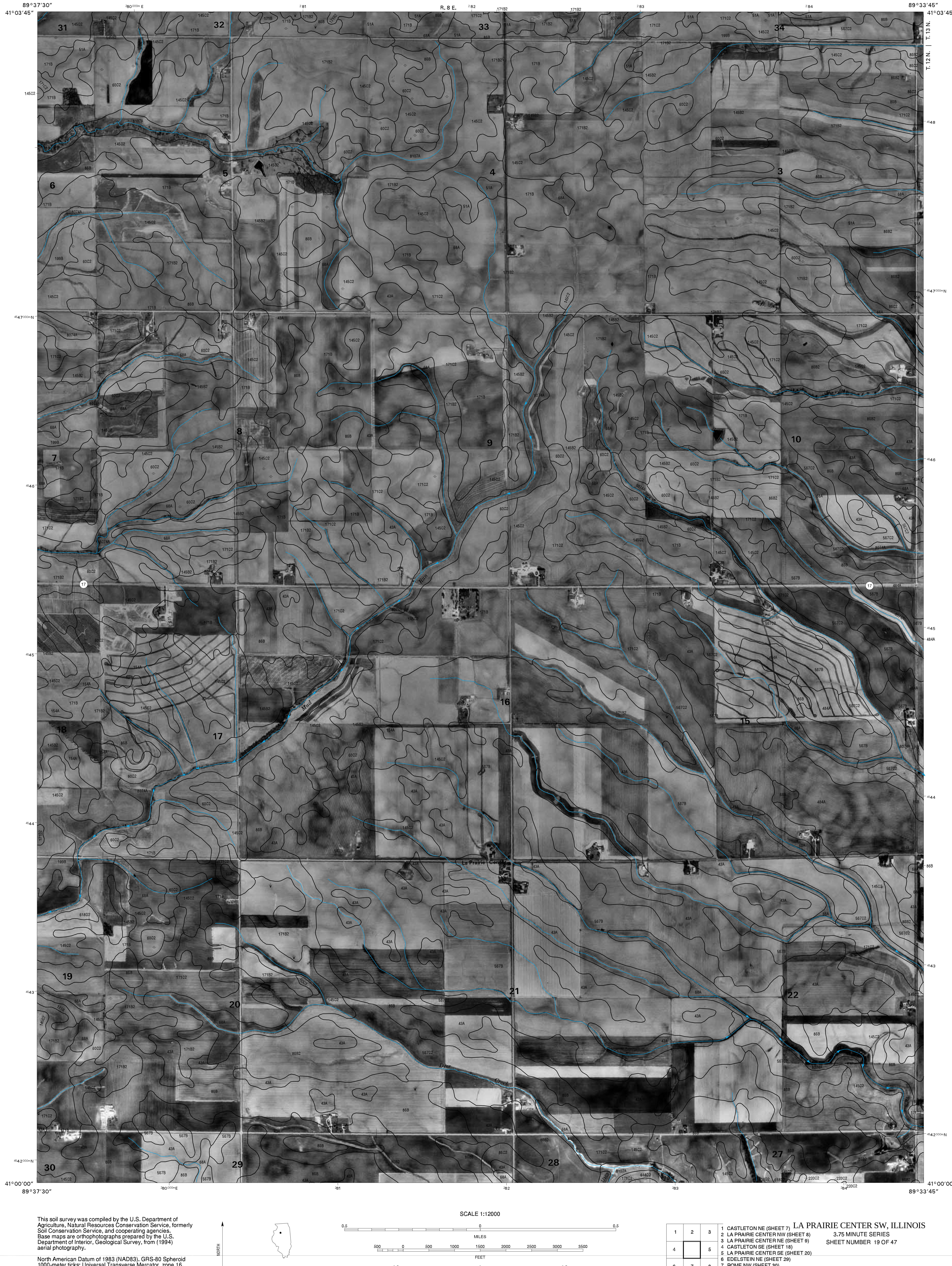
CASTLETON SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 18 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
LA PRAIRIE CENTER SW QUADRANGLE
SHEET NUMBER 19 OF 47



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North American Datum of 1983 (NAD83). GRS-80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 16.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 CASTLETON NE (SHEET 7)
2 LA PRAIRIE CENTER NW (SHEET 8)
3 LA PRAIRIE CENTER NE (SHEET 9)
4 CASTLETON SE (SHEET 18)
5 LA PRAIRIE CENTER SE (SHEET 20)
6 EDELSTEIN NE (SHEET 29)
7 ROME NW (SHEET 30)
8 ROME NE (SHEET 31)

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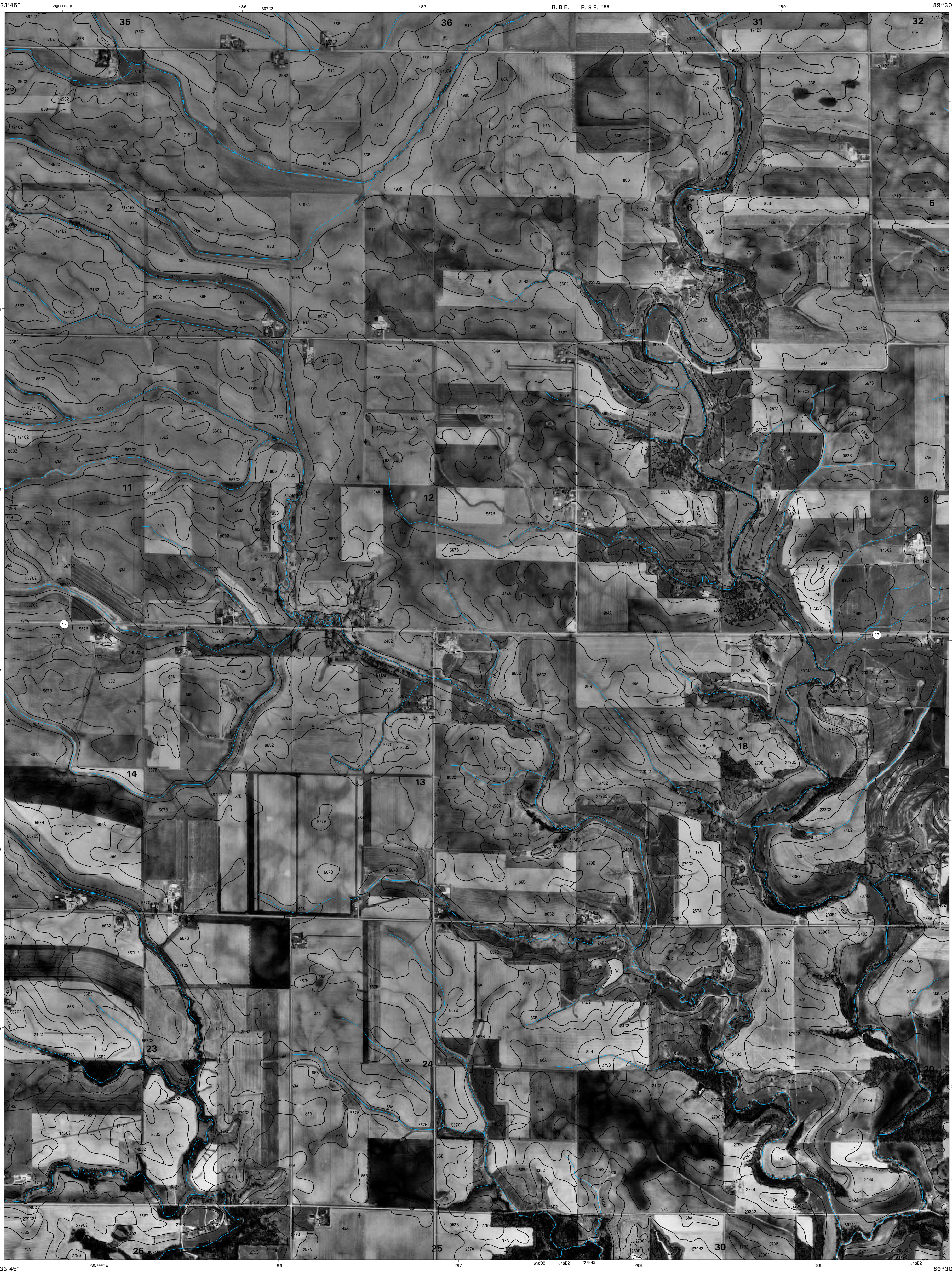
LA PRAIRIE CENTER SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 19 OF 47



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 LA PRAIRIE CENTER NW (SHEET 8)
2 LA PRAIRIE CENTER NE (SHEET 9)
3 LACON NW (SHEET 10)
4 LA PRAIRIE CENTER SW (SHEET 19)
5 LACON SW (SHEET 21)
6 ROME NW (SHEET 30)
7 ROME NE (SHEET 31)
8 CHILLICOTHE NW (SHEET 32)

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LA PRAIRIE CENTER SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 20 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
LACON SW QUADRANGLE
SHEET NUMBER 21 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 LA PRAIRIE CENTER NE (SHEET 9)
2 LACON NW (SHEET 10)
3 LACON NE (SHEET 11)
4 LA PRAIRIE CENTER SE (SHEET 20)
5 LACON SE (SHEET 22)
6 ROME NE (SHEET 31)
7 CHILLICOTHE NW (SHEET 32)
8 CHILLICOTHE NE (SHEET 33)

INDEX TO ADJOINING 3.75 MAPS

LACON SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 21 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 LACON NW (SHEET 10)
2 LACON NE (SHEET 11)
3 HENRY NW (SHEET 12)
4 LACON SW (SHEET 21)
5 HENRY SW (SHEET 23)
6 CHILLICOTHE NW (SHEET 32)
7 CHILLICOTHE NE (SHEET 33)
8 WASHBURN NW (SHEET 34)

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
HENRY SW QUADRANGLE
SHEET NUMBER 23 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 LACON NE (SHEET 11)
2 HENRY NW (SHEET 12)
3 HENRY NE (SHEET 13)
4 LACON SE (SHEET 22)
5 HENRY SE (SHEET 24)
6 CHILLICOTHE NE (SHEET 33)
7 WASHBURN NW (SHEET 34)
8 WASHBURN NE (SHEET 35)

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HENRY SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 23 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 HENRY NW (SHEET 12)
2 HENRY NE (SHEET 13)
3 VARNA NW (SHEET 14)
4 HENRY SW (SHEET 23)
5 VARNA SW (SHEET 25)
6 WASHBURN NW (SHEET 34)
7 WASHBURN NE (SHEET 35)
8 LA ROSE NW (SHEET 36)

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 HENRY NE (SHEET 13)
2 VARNA NW (SHEET 14)
3 VARNA NE (SHEET 15)
4 HENRY SE (SHEET 24)
5 VARNA SE (SHEET 26)
6 WASHBURN NE (SHEET 35)
7 LA ROSE NW (SHEET 36)
8 LA ROSE NE (SHEET 37)

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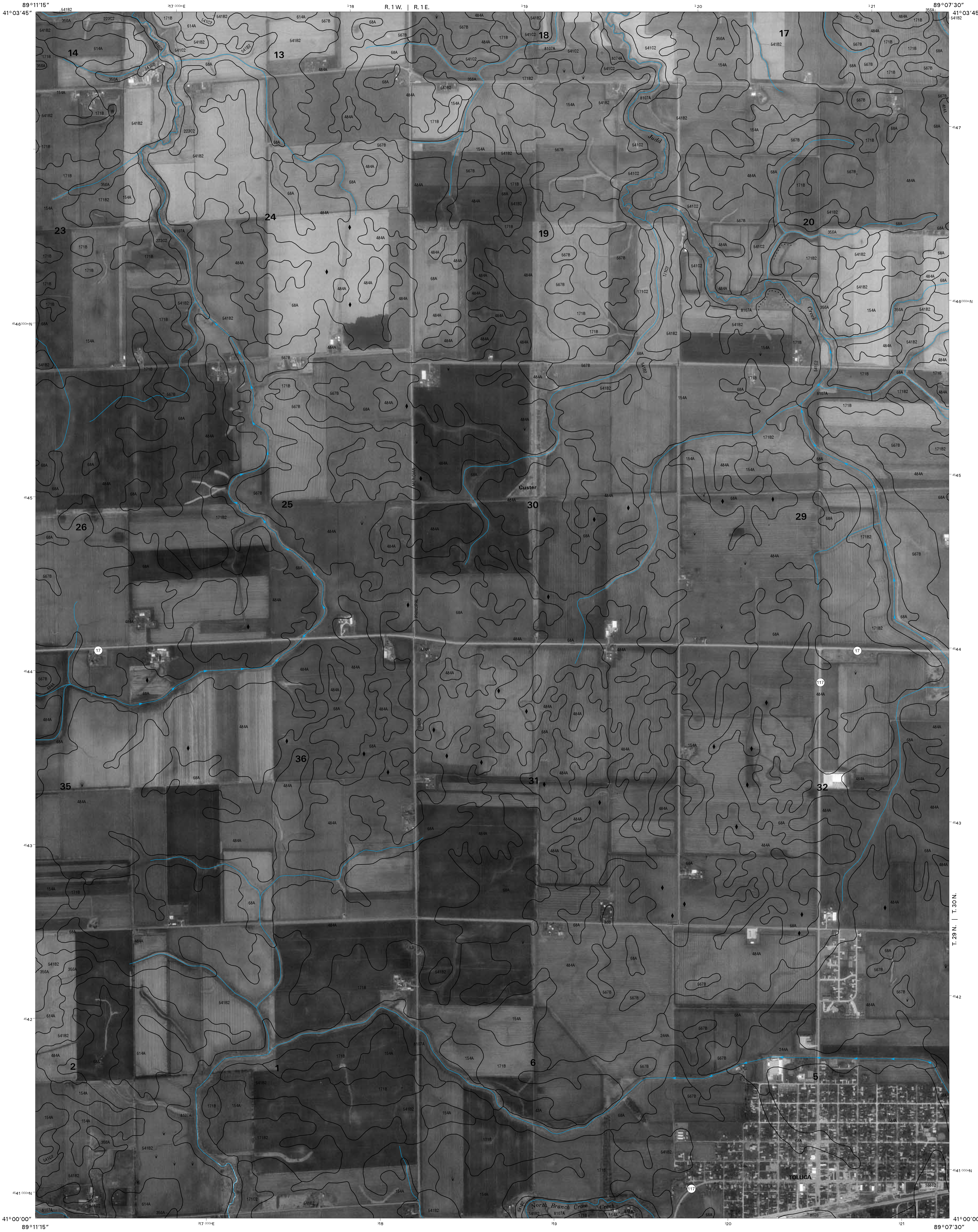
VARNA SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 25 OF 47



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 VARNA NW (SHEET 14)
2 VARNA NE (SHEET 15)
3 WENONA NW (SHEET 16)
4 VARNA SW (SHEET 25)
5 WENONA SW (SHEET 27)
6 LA ROSE NW (SHEET 36)
7 LA ROSE NE (SHEET 37)
8 MINONK NW (SHEET 38)

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VARNA SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 26 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
WENONA SW QUADRANGLE
SHEET NUMBER 27 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1 VARNA NE (SHEET 15)
2 WENONA NW (SHEET 16)
3 WENONA NE (SHEET 17)
4 VARNA SE (SHEET 26)
5 WENONA SE (SHEET 28)
6 LA ROSE NE (SHEET 37)
7 MINONK NW (SHEET 38)
8 MINONK NE (SHEET 39)

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WENONA SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 27 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
WENONA SE QUADRANGLE
SHEET NUMBER 28 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1998) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1 WENONA NW (SHEET 16)
2 WENONA NE (SHEET 17)
3 LONG POINT NW
4 WENONA SW (SHEET 27)
5 LONG POINT SW
6 MINONK NW (SHEET 38)
7 MINONK NE (SHEET 39)
8 DANA NW

INDEX TO ADJOINING 3.75 MAPS

WENONA SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 28 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
EDELSTEIN NE QUADRANGLE
SHEET NUMBER 29 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 CASTLETON SW
2 CASTLETON SE (SHEET 18)
3 LA PRAIRIE CENTER SW (SHEET 19)
4 EDELSTEIN NW
5 ROME NW (SHEET 30)
6 EDELSTEIN SW
7 EDELSTEIN SE
8 ROME SW

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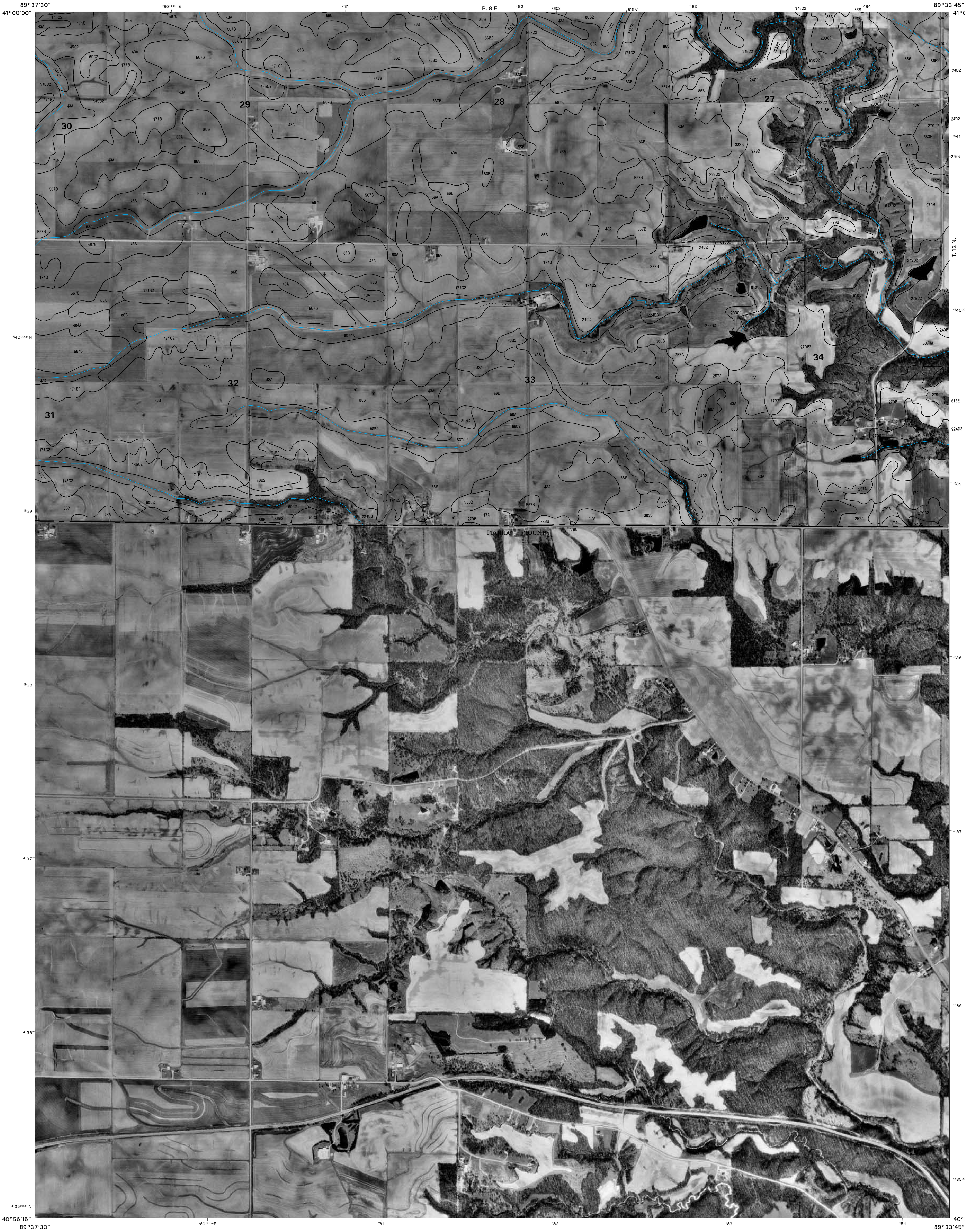
EDELSTEIN NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 29 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
ROME NW QUADRANGLE
SHEET NUMBER 30 OF 47



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 CASTLETON SE (SHEET 18)
2 LA PRAIRIE CENTER SW (SHEET 19)
3 LA PRAIRIE CENTER SE (SHEET 20)
4 EDELSTEIN NE (SHEET 29)
5 ROME NE (SHEET 31)
6 EDELSTEIN SE
7 ROME SW
8 ROME SE

INDEX TO ADJOINING 3.75 MAPS

ROME NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 30 OF 47

89°33′45″ 41°00′00″ — 89°30′00″ 41°00′00″

40°56′15″ 89°33′45″ — 40°56′15″ 89°30′00″

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 — 0 — 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 — 0 — 0.5

1	2	3
4		5
6	7	8

1 LA PRAIRIE CENTER SW (SHEET 19)
2 LA PRAIRIE CENTER SE (SHEET 20)
3 LACON SW (SHEET 21)
4 ROME NW (SHEET 30)
5 CHILLICOTHE NW (SHEET 32)
6 ROME SW
7 ROME SE
8 CHILLICOTHE SW (SHEET 40)

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ROME NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 31 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 LA PRAIRIE CENTER SE (SHEET 20)
2 LACON SW (SHEET 21)
3 LACON SE (SHEET 22)
4 ROME NE (SHEET 31)
5 CHILLICOTHE NE (SHEET 33)
6 ROME SE
7 CHILLICOTHE SW (SHEET 40)
8 CHILLICOTHE SE (SHEET 41)

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
CHILLICOTHE NE QUADRANGLE
SHEET NUMBER 33 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 LACON SW (SHEET 21)
2 LACON SE (SHEET 22)
3 HENRY SW (SHEET 23)
4 CHILLICOTHE NW (SHEET 32)
5 WASHBURN NW (SHEET 34)
6 CHILLICOTHE SW (SHEET 40)
7 CHILLICOTHE SE (SHEET 41)
8 WASHBURN SW (SHEET 42)

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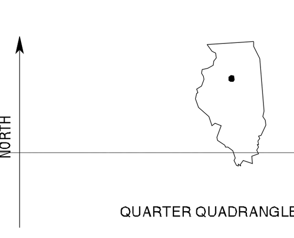
CHILLICOTHE NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 33 OF 47

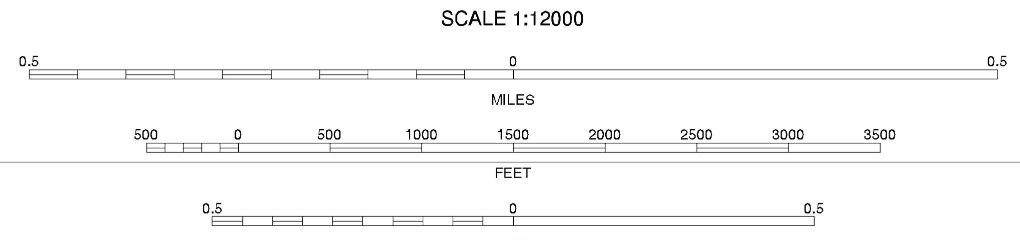
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 16.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



1	2	3
4		5
6	7	8

1 LACON SE (SHEET 22)
2 HENRY SW (SHEET 23)
3 HENRY SE (SHEET 24)
4 CHILLICOTHE NE (SHEET 33)
5 WASHBURN NE (SHEET 35)
6 CHILLICOTHE SE (SHEET 41)
7 WASHBURN SW (SHEET 42)
8 WASHBURN SE (SHEET 43)

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WASHBURN NW, ILLINOIS

3.75 MINUTE SERIES
SHEET NUMBER 34 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 HENRY SW (SHEET 23)
2 HENRY SE (SHEET 24)
3 VARNA SW (SHEET 25)
4 WASHBURN NW (SHEET 34)
5 LA ROSE NW (SHEET 36)
6 WASHBURN SW (SHEET 42)
7 WASHBURN SE (SHEET 43)
8 LA ROSE SW (SHEET 44)

INDEX TO ADJOINING 3.75 MAPS

WASHBURN NE, ILLINOIS

3.75 MINUTE SERIES
SHEET NUMBER 35 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
LA ROSE NW QUADRANGLE
SHEET NUMBER 36 OF 47

89°15'00" 41°00'00" — 89°11'15" 41°00'00"

40°56'15" 89°15'00" — 40°56'15" 89°11'15"

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 HENRY SE (SHEET 24)
2 VARNA SW (SHEET 25)
3 VARNA SE (SHEET 26)
4 WASHBURN NE (SHEET 35)
5 LA ROSE NE (SHEET 37)
6 WASHBURN SE (SHEET 43)
7 LA ROSE SW (SHEET 44)
8 LA ROSE SE (SHEET 45)

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LA ROSE NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 36 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 VARNA SW (SHEET 25)
2 VARNA SE (SHEET 26)
3 WENONA SW (SHEET 27)
4 LA ROSE NW (SHEET 36)
5 MINONK NW (SHEET 38)
6 LA ROSE SW (SHEET 44)
7 LA ROSE SE (SHEET 45)
8 MINONK SW (SHEET 46)

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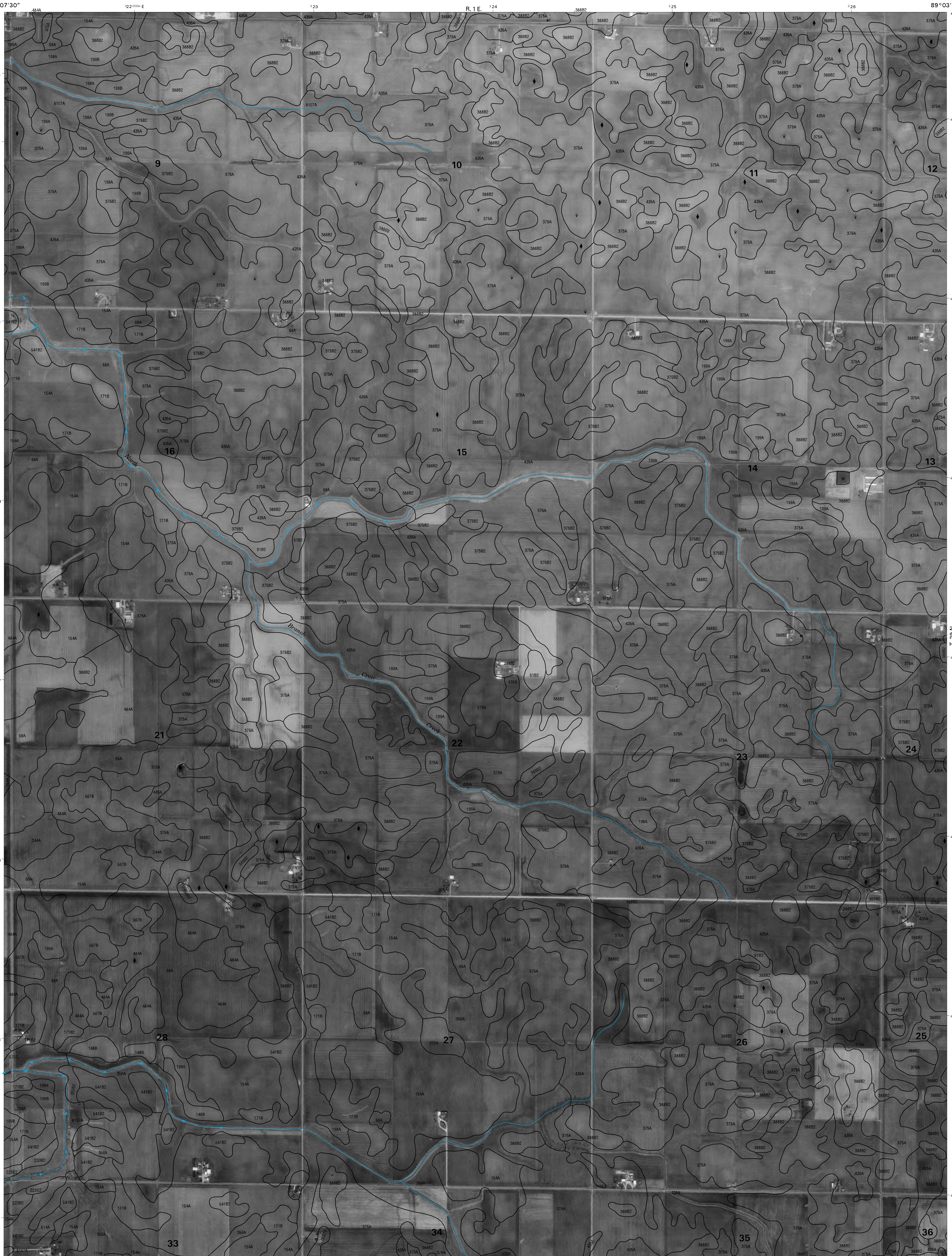
LA ROSE NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 37 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
MINONK NW QUADRANGLE
SHEET NUMBER 38 OF 47



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 VARNA SE (SHEET 26)
2 WENONA SW (SHEET 27)
3 WENONA SE (SHEET 28)
4 LA ROSE NE (SHEET 37)
5 MINONK NE (SHEET 39)
6 LA ROSE SE (SHEET 45)
7 MINONK SW (SHEET 46)
8 MINONK SE (SHEET 47)

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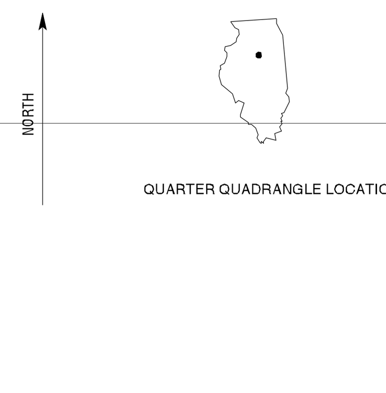
MINONK NW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 38 OF 47

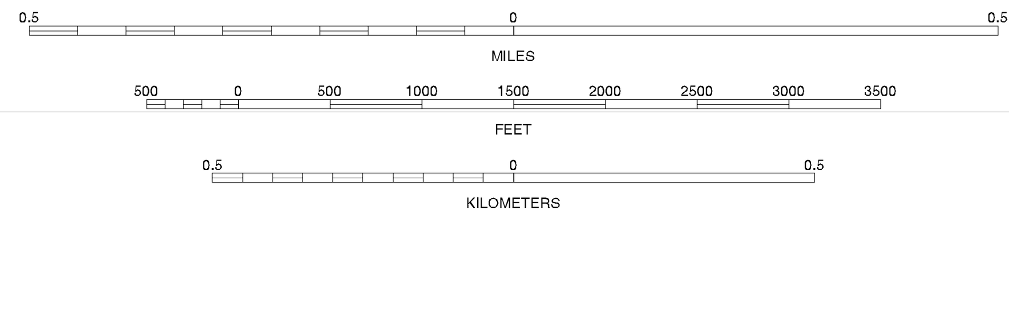
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1998) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



1	2	3
4		5
6	7	8

1 WENONA SW (SHEET 27)
2 WENONA SE (SHEET 28)
3 LONG POINT SW
4 MINONK NW (SHEET 38)
5 DANA NW
6 MINONK SW (SHEET 46)
7 MINONK SE (SHEET 47)
8 DANA SW

INDEX TO ADJOINING 3.75 MAPS

MINONK NE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 39 OF 47

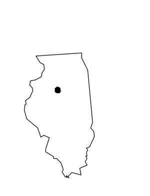
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
CHILLICOTHE SW QUADRANGLE
SHEET NUMBER 40 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 ROME NE (SHEET 31)
2 CHILLICOTHE NW (SHEET 32)
3 CHILLICOTHE NE (SHEET 33)
4 ROME SE
5 CHILLICOTHE SE (SHEET 41)
6 SPRING BAY NE
7 GERMANTOWN HILLS NW
8 GERMANTOWN HILLS NE

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CHILLICOTHE SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 40 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
CHILLICOTHE SE QUADRANGLE
SHEET NUMBER 41 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 CHILLICOTHE NW (SHEET 32)
2 CHILLICOTHE NE (SHEET 33)
3 WASHBURN NW (SHEET 34)
4 CHILLICOTHE SW (SHEET 40)
5 WASHBURN SW (SHEET 42)
6 GERMANTOWN HILLS NW
7 GERMANTOWN HILLS NE
8 METAMORA NW

INDEX TO ADJOINING 3.75 MAPS

CHILLICOTHE SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 41 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
WASHBURN SW QUADRANGLE
SHEET NUMBER 42 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 16.
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NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 CHILLICOTHE NE (SHEET 33)
2 WASHBURN NW (SHEET 34)
3 WASHBURN NE (SHEET 35)
4 CHILLICOTHE SE (SHEET 41)
5 WASHBURN SE (SHEET 43)
6 GERMANTOWN HILLS NE
7 METAMORA NW
8 METAMORA NE

INDEX TO ADJOINING 3.75 MAPS

WASHBURN SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 42 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
WASHBURN SE QUADRANGLE
SHEET NUMBER 43 OF 47

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1994) aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 WASHBURN NW (SHEET 34)
2 WASHBURN NE (SHEET 35)
3 LA ROSE NW (SHEET 36)
4 WASHBURN SW (SHEET 42)
5 LA ROSE SW (SHEET 44)
6 METAMORA NW
7 METAMORA NE
8 ROANOKE NW

INDEX TO ADJOINING 3.75 MAPS

WASHBURN SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 43 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1 WASHBURN NE (SHEET 35)
2 LA ROSE NW (SHEET 36)
3 LA ROSE NE (SHEET 37)
4 WASHBURN SE (SHEET 43)
5 LA ROSE SE (SHEET 45)
6 METAMORA NE
7 ROANOKE NW
8 ROANOKE NE

INDEX TO ADJOINING 3.75 MAPS

LA ROSE SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 44 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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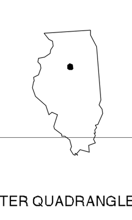
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 LA ROSE NW (SHEET 36)
2 LA ROSE NE (SHEET 37)
3 MINONK NW (SHEET 38)
4 LA ROSE SW (SHEET 44)
5 MINONK SW (SHEET 46)
6 ROANOKE NW
7 ROANOKE NE
8 BENSON NW

INDEX TO ADJOINING 3.75 MAPS

LA ROSE SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 45 OF 47

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 LA ROSE NE (SHEET 37)
2 MINONK NW (SHEET 38)
3 MINONK NE (SHEET 39)
4 LA ROSE SE (SHEET 45)
5 MINONK SE (SHEET 47)
6 ROANOKE NE
7 BENSON NW
8 BENSON NE

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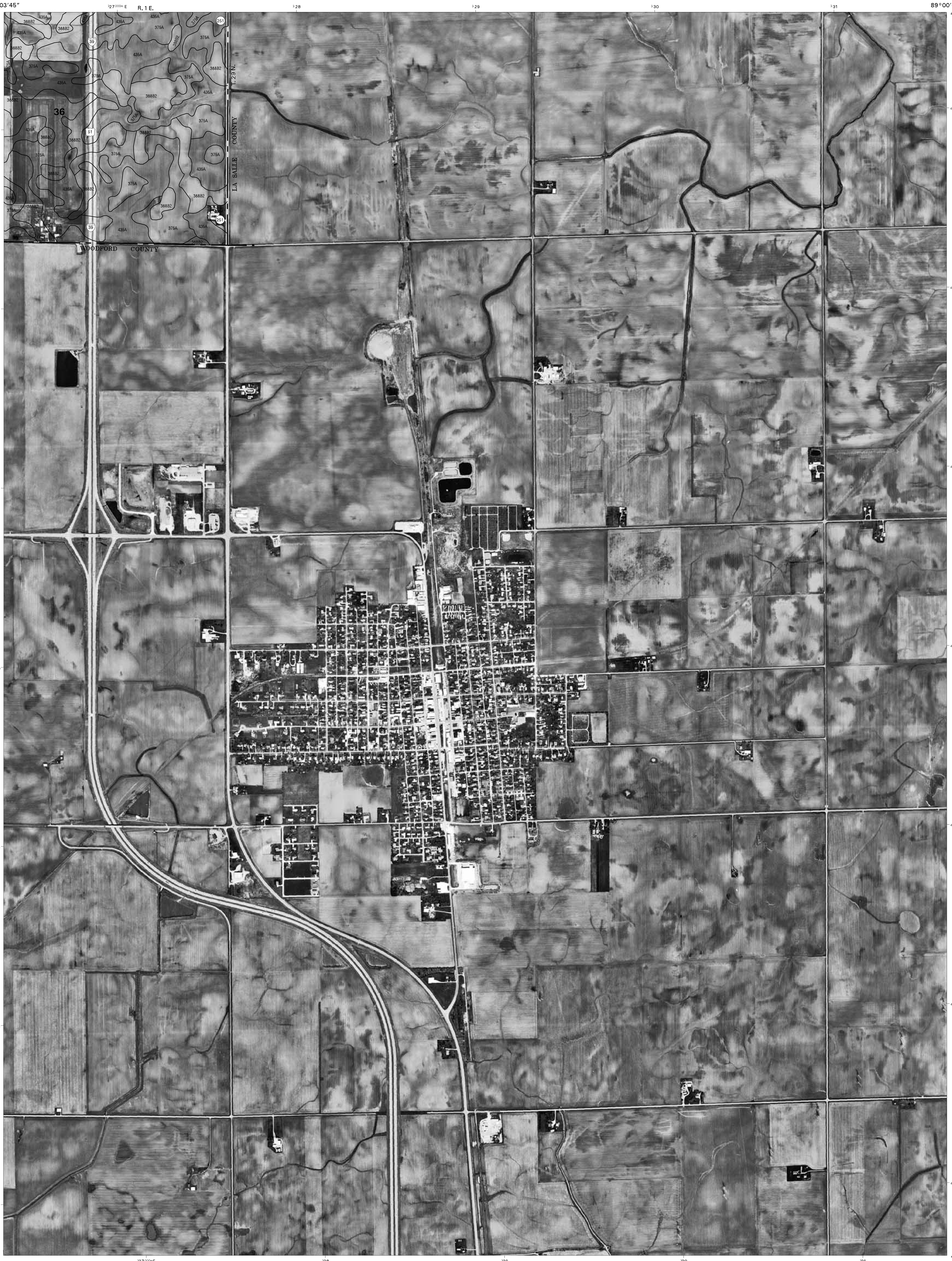
MINONK SW, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 46 OF 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MARSHALL COUNTY, ILLINOIS
MINONK SE QUADRANGLE
SHEET NUMBER 47 OF 47



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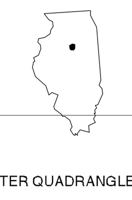
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 MINONK NW (SHEET 38)
2 MINONK NE (SHEET 39)
3 DANA NW
4 MINONK SW (SHEET 46)
5 DANA SW
6 BENSON NW
7 BENSON NE
8 FLANAGAN SW NW

INDEX TO ADJOINING 3.75 MAPS

MINONK SE, ILLINOIS
3.75 MINUTE SERIES
SHEET NUMBER 47 OF 47